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Bob Cooper's

2008

JANUARY 22 2007

SatFACTS

MONTHLY

Reporting on "The World" of satellite television in the Pacific and Asia

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Vol. 14 ◆ No. 161
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A debate on the rules of digital recording?

Should software limit consumer access to HD digital recording?

In the hardware arena, how will viewers be able to watch one channel while recording for later viewing a second?

Under HDMI/HDCP protocols, will viewers be able to transfer recorded material to other equipment, even in the same household?

Will it be possible to continue recording in analogue format (to VHS tape) HD broadcasts in the SD format?

How does 'built-in-copy-protection' technology work to the benefit of viewers?

freeview

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Easy installation and Setup

Front

Rear

ZINWELL

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SatFACTS MONTHLY

ISSN 1174-0779

is published 12 times each year (on or about the 15th of each month) by Far North Cablevision, Ltd. This publication is dedicated to the premise that as we enter the 21st century, ancient 20th century notions concerning borders and boundaries no longer define a person's horizon. In the air, all around you, are microwave signals carrying messages of entertainment, information and education. These messages are available to anyone willing to install appropriate receiving equipment and, where applicable, pay a monthly or annual fee to receive the content of these messages in the privacy of their own home. Welcome to the 21st century - a world without borders, a world without boundaries.

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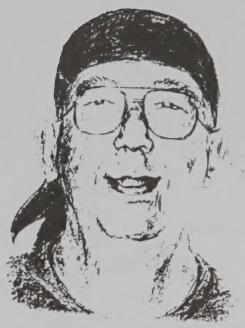
Now year fourteen!



January 22, 2008

Late Entry Penalty

In all things commercial in this world we find "early adopters" and those who will wait until the final seconds to act. New Zealand was in the middle (behind Australia but ahead of Zambia) in settling on a technical plan for transitioning television from analogue to digital.

"*We* (NZ) *will benefit from the mistakes of the early adopters*" and "*the cost of entry will be lower after the initial surge*," we were assured.

In the USA, Government is in the processing of giving away 30 million $40 'vouchers' which allow consumers to acquire terrestrial (NTSC) STBs. Around 20 different makes and models have been 'approved' for sale and more are coming on line weekly. By the way - the least expensive of these STBs just happens to be US$40 - one coupon per box and the consumer is off to install it.

In Australia the least expensive terrestrial 'SD' STB is A$34.99 (model D72022 from Aldi); *retail*. Prices for the UK version of terrestrial Freeview are very similar. So it would be accurate to report UK/A/USA$40 seems to be a pivotal 'SD' price.

New Zealand's satellite Freeview STBs fall into two categories - those approved for sale (Zinwell and Hills) and those without certification (Coship, Kaon, Strong are primary contenders here) . At the dealer level, the non-certifieds typically cost NZ$100 and the certifieds up to twice that. Retail outlets selling only the certifieds usually promote them at NZ$250-295 while the non-certifieds typically go into retail hands at just under NZ$200.

New Zealand is now approaching the launch of terrestrial digital and Freeview is once again going through the motions of 'approving' STB designs. The official line at Freeview is "*Your box must have HD functions or you won't be able to receive HD broadcasts*." This is a partially true statement - one designed to lead the buying public to only certified terrestrial boxes. First this fact - TVNZ will be broadcasting in (720p) HD whenever and wherever possible. But - and this is the key here - for each such HD broadcast there will be simultaneous access to the same program in SD.

If the consumer home is already equipped with an appropriate HDMI/HDCP receiver (or plans to rush to the nearest store to buy one), then yes to view the HD version of the broadcast you will need a certified STB. But for the vast majority of viewers, lacking an HDMI/HDCP TV set, they will be forced to watch the SD version of the same programme. A certified box is NOT essential to watching Freeview terrestrial. A standard MPEG 4 terrestrial box will do just fine, connecting to the existing analogue input TV set either at UHF (through the STB's modulator) or via component (3 wire) or composite (2 wire) cables.

Furthermore, HD capable STBs will within a few years be gathering dust in garages when the next generation of digital-equipped TV sets appear - each complete with internal HDMI/HDCP and the magic digital tuner that will in effect eliminate the need for a STB. A consumer who waits perhaps two years can purchase a true HDMI/HDCP compatible receiver has no need for the 'approved' version terrestrial STB; only the early adopters do.

I have been monitoring the pricing structure of the various potential Freeview terrestrial STBs at the manufacturer level. A non-certifiable (lacking HDMI hard and software) will end up going to dealers at about the same price as the existing satellite versions; $100. The certifiables, with the pricey HDMI hard and software and MHEG-5, will apparently be in the NZ$250 region to dealers; the result of the costly HDMI inclusion.

Chain retailers will of course do their best to push the 'certifieds' and the consumer will fall for a sales pitch that includes the phrase, "*You cannot watch the HD broadcasts without an HD capable STB*." Once again - unsaid will be "Of course you can watch the same programme in SD" followed by "Oh by the way - to 'go along with' this HD STB, let me show you the new TV sets that have the same HD(MI) capability!"

In the UK, Australia and USA, consumers have a choice in terrestrial STBs. Some have HDMI, some do not. And those that do cost more - our NZ version 'loaded' with HDMI, MHEG-5 will leave the Chinese factory in the region of US$140 each (that's NZ$180 at the moment). Now - let's hear three cheers for not rushing into digital TV.

In Volume 14 ◆ Number 161

Lightning after effects - p. 7, After we are digital - THEN WHAT?-p. 8,

Departments

Programmer/Programming -p.2; Hardware/Equipment Update -p. 4; SatFACTS Digital Watch -p. 22; Supplemental Data -p. 24; With The Observers -p. 25

-On the cover -

A debate - well, a discussion of where we end up at the end of the digital transition tunnel and a concern how consumer viewers will cope in a 'brave-new-world'.

LETTERS

Curse on SKY TV

"Reference your page one comment for SF#160 (December). I am the fellow you wrote about - the one who believed SKY was selling Freeview installs for $145 inclusive of non-Freeview Prime. While I appreciate that you did not directly identify me, even before SF December was in people's hands I had significant adverse feedback. I have had my SKY TV Tech card withdrawn apparently because I am doing Freeview. I do not do conflicting domestic installs - my forte is commercial installations. I believe this is all due to a SKY regional manager who has apparently had conflict with my enthusiastic support of FTA (C and Ku) systems and an attempt to make these options available to a wider audience. A local newspaper published a story about my endeavours and in it the reporter who did his research mentioned that BBC on C-band was available FTA for those with suitable equipment. The next thing I knew there was an 'urgent' telephone call from the BBC office in Sydney advising me in no uncertain terms that SKY NZ was the official distributor for BBC here, and I was not to ever even think about putting in C-band systems for this purpose. Here I was - a one-man operation who might in a very good year actually sell one or two C-band systems, attracting the high minded legal warning from an important sounding person at the BBC! So as a result of this and the action of a regional SKY manager, I have lost my credentials to deal with their customers. Moving on - yes, I believed for $145 SKY installers were putting in Prime + Freeview packages - and although your December page one had SKY management denying that, and Freeview's Browning saying he had no 'evidence' of that, think of it this way. Pay SKY $145 and they give you a dish, LNBF, cable, mount, decoder box and do the installation. How big a step is it from there to 'plus you also have Freeview'?"

CC, New Zealand

Comments from others?

PROGRAMMER PROGRAMMING PROMOTION UPDATE

JANUARY 22, 2008

JANUARY issue reminder: Because of the extended holiday period for our magazine's printer the January issue is scheduled into the mails January 22nd; February on 15th!

Another satellite installer TV show. Check out www.dmsiusa.com for a hard schedule to 'FTA Satellite Sales' hosted by Rick Buckner and personnel from DMSIUSA. The show is designed to introduce to FTA installers the latest hardware created for the free to air market - and because it originates through the facilities of DMSIUSA, you can count on it being interesting.

The 'can-you-believe-this???' file. If you were having difficulty getting your head around the new HDMI/HDCP 'rules' our feature beginning page 8 may help. Or perhaps not. For example, in addition to the "*YOU may not record this broadcast*" instructions which HDCP will contain, there is the "*YOU may NOT view this broadcast on any display larger than 1 metre* (diagonal measurement)." Read it again; it is correct. That is 39.3 inches corner to corner. Let's see - a 42" plasma (or LCD) screen measures what? 108.5 cm, whereas 1 metre diagonal is almost precisely 100cm. So in HDCP equipped TV sets is there factory installed software which will be 'told' by the programmer who follows the letter of the written program-use-rights agreements, "Turn off this display because it is too large for the following HDCP-limited broadcast?" Have consumers been pre-warned that the 42" (or larger) displays they are rushing to purchase may not function on some programmes? Is this 'software implemented limitation' designed to control commercial establishments (bars, clubs) which until now have been able to profit nicely from large screen displays of popular events such as sport? Will someone come out with an 'image reduction mod' that reduces large screen displays to precisely one metre diagonal? Stay tuned.

More than 1,000,000 $40 DTT STB coupons were approved for distribution by the US government during the first ten days of becoming available; 30 million will be issued. The concept is that a home may request one or two coupons to 'defray the cost of transitioning from analogue (February 2009) to digital'. The digital STBs will allow existing analogue-only receivers to continue to receive TV provided the home has an adequate antenna to feed the box. About which - of the nearly 1,800 *stations* to transition in 02/09, 81% will after shutting off analogue be operating with one of more of the following handicaps: (1) On a temporary channel, (2) Using a lower-than-permitted (elevation) 'temporary' transmit antenna, (3) Using lower than permitted transmitter power. And as for how many of the 30 million coupons will ever be connected to 'adequate home reception antennas' - well, good luck!

Time is of the essence, don't waste your **money**....

UNAOHM

Instant Spectrum Response Unaohms AP Series Instruments have real time colour spectrum, eliminating time wasted with slow screen refresh.
Other features include :

- Satellite-QPSK DVB-S & 8PSK DVBS-2
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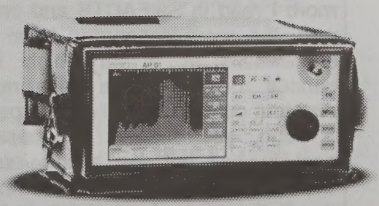
- Li-ion Battery
- Transponder Recall TBAT
- MPEG 2/4* - NIT
- Adaptive Equalizer Response for DVB-T (AER)
- 3kg weight

*mpeg 4 coming soon



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Branches in Sydney, Ulverstone & Coffs HarbourNew Zealand: Hills Signal Master (09) 2746509

Laceys.tv
TM

Blast from the past

"From my closed satellite business (2001) there are two SA receivers which were BBC authorised and six DMV professional IRDs. Anyone with an interest in these quality items at a reduced price, contact me directly."

David Weaver in Hong Kong
strltd@netvigator.com

Three missing Chinese

"Following your helpful suggestions in SatFACTS (#157, p. 2) I have installed a 1.8m C-band dish. Now I can receive more than 30 channels with very high quality pictures, in the 70-98% range on the menu screen. But there are three which fail to load (lock): CCTV-4 (3771H), HNTV (3750H) and Phoenix (3730H - which I understand is CA but still it should load - yes?). Can you make any suggestions?"

Francis Chang, Christchurch

Interesting problem. Notice that the 'missing' channels are grouped at low end of the spectrum and all have mid-range symbol rates (9375 to 10490). There are two likely fixes - first carefully check the feed positioning relative to rotation (there are possible sources of cross pole interference at 3740V and 3769V). Move (rotate) the feed a few mils at a time, stop to retry say CCTV, marking the start point so you can return there if rotation does not correct it. Next try a different receiver - the grouping of symbol rates +/- 10000 could be an IRD software problem.

Totally confused?

"I have read SatFACTS for many years and until quite recently understood even the more technical articles. But along about the time that you began to report in some depth on the analogue to digital transition I suddenly felt like a first grader in a year twelve classroom. I am lost, hopelessly so. I believe I detect a degree of cynicism in the reports suggesting you are not totally certain the digital transition will go smoothly. I first thought 'I simply do not understand the new rules' but the more I read in SatFACTS and on the web, the more concerned I am that somewhere at a very high level serious mistakes have been made. And that consumers will end up paying a huge, you suggest unnecessary, cost to bail out the system which seems to have been designed not for the betterment of television but the enrichment of equipment suppliers and programmers. Am I missing something here?"

BR Chase, NZ

Welcome to year 12.

HARDWARE EQUIPMENT PARTS UPDATE

JANUARY 22, 2008

The cost mystery. Freeview terrestrial digital reception STBs heading for New Zealand shortly are going to be expensive (see p. 1 here). Or at least that seems to be the indication from Chinese (and other) factory sources. Some suggest it is MPEG-4 (versus MPEG-2 used in the usual comparisons with Australia) but MPEG-4 has been around in DVD players for some time so that seems like an incorrect rationale. Others suggest it is MHEG-5 and as we are all aware, this software used by NZ Freeview is owned by a supplier (Zinwell) and they do expect a license fee per unit if included inside of a STB. And still others blame HDMI (the software and the physical parts including socket on STB's rear apron). The reality is we are asking New Zealand STBs to do more than perhaps any similar STBs in history - including the UK. Australian HD version STBs start at around A$99 (Tevion) and go upward ($199 for TEAC). The Tevion has HDMI, DVI, YPbPR, RGB, S-video and RCA (composite) outputs and does 1080i, 720p, 576p and 576i. The TEAC version includes Teletext and closed captioning, EPG, S-PDIF digital audio and HDMI. At A$799 is the Topfield HD STB/hard drive recorder with twin tuners (watch one, record one). Consumers in NZ are going to be hard pressed to find similar pricing when Freeview DTT goes on sale shortly - being first comes at a price. Being 'too late' can cost even more.

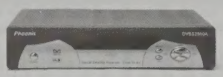
Fijian judge opts out. SF#160 (p. 4) reported a Fiji court case pitting Sky Pacific against a wireless telecommunications firm licensed by Government to utilise 3.4-3.7 GHz frequencies. Sky Pacific has experienced significant LNB problems in areas near the wireless transmitters although the satellite service operates at the 'top end' (4055 and 4095 MHz) of C-band. The problem is simply overload of the 50 dB gain LNBs and their inability to distinguish between the local very strong terrestrial signals and the distant much weaker C-band services. On January 14, Judge Roger Coventry ruled 'no decision' advising '*mediation to resolve the dispute*'. The case is complicated by the status of (a military) government having a *possible* influence over court decisions. Sky Pacific believed the recent ITU near-unaminous decision to advise against use of 3.4-3.7 for terrestrial services would convince the court that the Fiji government may have 'erred' in allowing this confrontation to develop. Wireless take-up has been significant in Fiji where existing terrestrial telephone service is hampered by lack of broadband capability and ageing copper based lines. But the interference to Sky Pacific, from wireless, is and continues to be a major problem effectively creating 'donut holes' around wireless transmission sites where Sky Pacific simply cannot be received due to the LNB overload problem.

Meanwhile - outside Fiji. A December survey by SatFACTS of regions served by Sky Pacific shows around 1 subscriber in 5 is outside of Fiji. Among the hot spots, Nauru while American Samoa has good numbers. New Caledonia is latest to start.

Phoenix Technology Group

Satellite Equipment & Accessories One Stop Supermarket

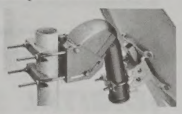
Phoenix 2.35m Motorized Extra Heavy Duty Mesh — **$180 each Buy 10 get one Free!**



Phoenix 2800A $90
The Best FTA Available
Quantity price available

Dreamax DT470 $90ea
Irdeto 2 Rec min 5 buy
Perfect For Selectv

Zinwell 15K LNBF $24/each for box of 24



H-H Motor $85ea

SuperJack EZ2000 Positioner $50/each

Star V Box II DiSEqC1.2 Positioner $45 each *how low is this*

Actuator from 12' standard duty to 36' heavy duty From $35/each to $220/each

RG6 305m
Dual shield
$55/Box
Quad shield
$65/Box

Folding Arm Dish
best dish for caravan kits
35cm $80 each Inc Case
64cm $25 each Wide Beam
78cm $44 each Aurora
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Made in Denmark

Local Antennas Full range
In stock Now From $25 10 buy

Caravan Digital Ant	**$80**	**PBI C+Ku band LNBF**	**$65**
One Leg TV Antenna MNT 1.8m	**$15**	**Zinwell C band LNBF**	**$28**
Dual KU lnb holder adjustable	**$20**	**Zinwell Prime Focus KU Dual Output**	**$60**
75cm KU offset dish	**$30**	**Star C band LNBF**	**$18**
90cm KU offset dish	**$35**	**MTI one cable solution LNBF**	**$45**
One leg gutter mount	**$18**	**Satellite finder**	**$20**
Two leg gutter mount	**$22**	**Mobile Sat Ground Mount**	**$77**
Tin roof mount	**$20**	**RG6/RG11 crimper**	**$20**
Wall mount	**$14**	**Angle meter**	**$35**
19" LCD Bracket	**$40**	**Compass High Quality**	**$10**
2.3m SD mesh dish	**$130**	**RG 6 Crimp Connector 100 pack**	**$25**
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3" 3m galvanised pole	**$36**	**Satellite 2 way splitter**	**$2.50**
3" 3.5m galvanised pole	**$42**	**Satellite 4 Way split**	**$4.50**
3" Tripod Mnt for C band dish	**$30**	**Digiair Terrestrial hand held meter**	**$350**
Speaker Stand for caravan use Ku dish	**$40**	**Star LED Easy to use Satellite Meter**	**$75**

This Months Specials

Phoenix JT-3960A
Digital Terrestrial Receiver
$50.00ea 10 buy

Coship 5110D
Licenced irdeto 2 Sat Receiver
Auto rescan when powered up

New Star 2880C FTA Receiver
Blind Scan! $65 ea Min 5 Buy

Latest Release
Phoenix 1.8m
Solid 6 Piece Dish
C & KU Band
Polar Mount
$135.00
Yes You Can Motorise

****New Phoenix 100-CA****
Licenced Irdeto 2 Receiver
Suits all Irdeto 2 services inc Gamma Card

$95.00ea
Min 5 Buy
Special QTY Price Available Please call

Phoenix 3600C
Latest Model to suit Selectv
Satellite & Terrestrial Dual Tuner
Have Local Channels & Selectv all in one box
All at a new LOW Price
$120.00 ea 6 buy

Phoenix 65cm
KU Dish
How low can they go?
$22.00ea

irdeto Cam Version 2.26D $70.00 Trade Price breaks in place for larger Wholesale Qty's

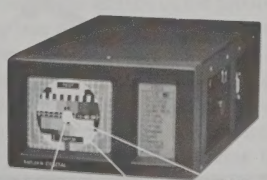
Latest Release Licenced Irdeto Dual cam $120.00

Kingray MHW-34F Inc Power supply $50.00 *crazy*

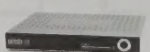
Highest Gain Televes UHF Deep Fringe Antennas
Instock Now

SATLOOK Digital NIT $1395

Satellite-receiver 920-2150 MHz.
- Spectrum-analyzer with expanded spectrum.
- Digital BER, QPSK and S/N-ratio.
- 4.5" B/W monitor for PAL/NTSC/SECAM.
- Tuneable sound 5.5 - 8.5 MHz.
- LNB voltage 13/18v. 22 kHz tone switch.
- DiSEqC control (1.0, 1.1, 1.2)
- KU- and C-band (normal/inverted video).
- 99 memory-positions for spectrum pictures.
- Satellite identification.
- Symbol rate 1-30 Msymb/s.
- RS 232 for PC connection
- Built in, rechargeable battery.
- Only 5 kg complete with carrying-case.



selectv
authorised dealer



Selectv Card & STB Package $77.00 ea Trade and Dealers only on this package

Two New Dealers:
New Dealers Welcome

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SatPlus QLD Unit 12 /22-26 Cesna Dr Caboolture QLD 07 5495 7674

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Phone: (03) 9553 3399 Fax: (03) 9553 3393
E-mail: sales@ptv.com.au

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DIGITAL SATELLITE RECEIVER

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Very compact
Suits all Irdeto Pay TV services & Aurora
CVBS & Component outputs
Designed in Australia
Great for C-band Motorised, DiSEqC 1.0/1.2
Plays all Irdeto cards including *Gamma*

Irdeto Licenced

Dual Irdeto Cam
New to Australia/New Zealand

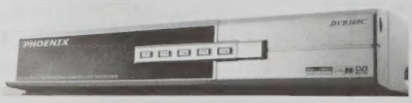
Irdeto 2 Licenced
This new unit fits in to your standard CI slot
Simply insert card number one in to the full size card slot and then cut the 2nd card down to suit the sim card holder (same as a mobile phone) then you may watch both Irdeto cards in the one cam, cutting template included.

CALL NOW FOR LATEST PRICING

Phoenix 3600C Dual Tuner
Designed for Selectv

Watch Local Channels with your Selectv
This unit has one Satellite tuner &
one Terrestrial Tuner built in, simply place your Selectv card or *Gamma* card in the card slot and you have everthing in one STB
Fully DVB-T, DVB-S, MPEG2 compliant
Single channel listing (DVB-T & DVB-S)
CVBS & Component video outputs

New Model



Mobile Satellite Ground Mount
For Caravan & Motor Homes

Very Strong Gal tubing
Compact fold away design
Best tripod available

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Danger: 1 **Billion** volts!

Visual Evidence of a Lightning strike

Lightning begins as an atmospheric discharge of electricity. A bolt of discharge can travel at speeds as great as 220,000 km/h with a peak temperature greater than 30,000 degrees C; six times greater than the temperature of the sun's surface! World-wide, there are more than 16 million lightning storms each year. In Equatorial Africa, every square kilometre averages 158 strikes per year (!). A single lightning bolt can reach a voltage potential of 1 billion volts and discharge up to 100,000 amperes of current. What appears as a single lightning bolt more often than not is actually 3 to 4 separate discharges, timed at approximately 50 millisecond intervals, each following the same pathway from cloud to earth.

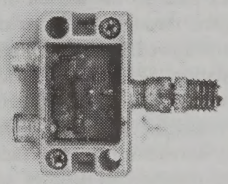
Lightning seeks a 'grounded' discharge point and once 'grounded' will travel for hundreds of metres in all directions in wet, sandy soil or bodies of water. Lightning striking an object (a building, for example) immediately seeks 'conduits' for transmission; any conductors (electrical, telephone, cable TV, metal pipes) within the facility become retransmitters and the discharge will continue to follow such conductors until resistance by the conductor dissipates the charge or a device absorbing the strike simply disintegrates thereby ending that particular pathway - unless the discharge remains at a high enough potential to physically 'jump' (bridge through the air) to another ground connected system.

It is not nice to fool with Mother Nature and world-wide several thousand die annually from strikes of lightning.

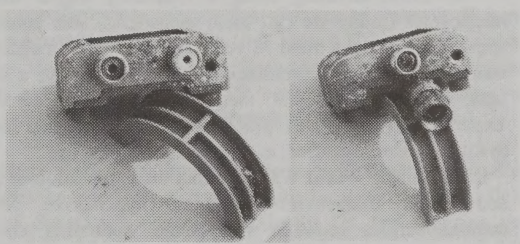
December 6, 2007; State Highway Ten, Coopers Beach, Far North, New Zealand; 6:47AM. An undetermined number of lightning strokes attach to earth at three homes, five pole mounted power transformers. Wall mounted cooking ranges are not merely destroyed, the physical implosion actually bursts the stoves from their wall hole as projectiles. One home plumbed with copper pipe has structural damage wherever a piece of copper entered a poured concrete foundation plate; the concrete turns into shrapnel puncturing nearby walls, breaking windows, penetrating the metal skin of a formerly almost-new car. By noon on December 6th the tallies revealed more than 250 telephone lines had been damaged, some literally disappearing as physical objects although the wire had been buried several feet below the surface of the ground.

Buried telephone cable was not the only sub-surface victim. Power cables to more than a dozen homes also broke down or as with the telephone lines simply went 'poof' and disappeared. And then our cable TV system - approximately 100 metres of 1/2" (0.500) aluminium jacketed cable also disappeared - turning to a residue of gray-white powder leaving behind a trail of useless chemical compounds.

Far North Cable TV lost 31 pieces of active and passive equipment in the second following the attack, more than 600 metres of buried RG6 cable along with the 'poof-it-is-gone' 100 metres of 0.500 trunk line cable. The township of Mangonui suffered through a 36 hour cable outage, unnoticed by many because their telephones and power were also absent for about the same length of time. Tens day after the event, five end of line homes remained without service.



Blackened parts tell what happened; big time voltage (above). One clean (below, left), one black and the destroyed input (right) with collapsed F fitting.



Shield gone (above) - simply evaporated. And every 5 metres or so, the drop line had a voltage 'bulge' (below) - each of which looked like this.

After we have been 'digitised' -

THEN WHAT?

It all seemed so logical in the beginning. *Digital.*

Analogue dates back to the launch on radio broadcasting (1909) and has gone through a number of transformations in the 99 years that followed. AM (amplitude modulation), FM (frequency modulation), PM (phase modulation and several variants that never caught on commercially), SSB (single sideband), VSB (vestigial sideband as employed in analogue TV transmission), spread spectrum - each was developed to satisfy a particular commercial need or as in the case of FM, the system was created and marketing types found a use for it after that creation.

All analogue formats share one characteristic: Each occupies a 'bandwidth' or chunk of spectrum space and for interference-free reception within a 'coverage area' one cannot operate two (or more) transmitters using the same spectrum segment simultaneously.

In 1930, anything using a frequency higher than 30 megacycles (today we call them megahertz) was considered 'experimental' and a mere 78 years ago 30+ Mc/s (megacycles) was of virtually no commercial interest. By 1940, a decade later, frequencies higher than 80 Mc/s were considered 'experimental' and limited practical uses for the region from 30 to 80 had been identified; experimental TV was one.

It was during World War Two that the exploration of higher and higher frequencies went into hyper-drive. Military communications required short-range, saturating coverage between mobile units; radar required pin-point accurate beams which could only be produced (according to theoretical physicists who had 'never been there' in person) at ultra short wavelengths - at least 1,000 Mc/s and perhaps even higher (more megacycles). All of this was very challenging stuff for a world where only ten years prior 30 megacycles was considered "the end of the useful spectrum."

The primary obstacles to be overcome revolved around hardware ('software' as we know it today was not even a word in the dictionary in 1940!). Without respect to 'which frequency' for any radio based system to function there must be as a minimum two pieces of hardware: (1) a transmitter to generate (create) the signal, and, (2) a receiver to demodulate (extract intelligence from) the transmission. Each transmitter occupies invisible space (kilocycles/kilohertz or megacycles/megahertz) which we cannot see - a chunk of the 'radio spectrum' which happens to be a low class cousin of the visible (light) spectrum. Light 'waves' are in fact almost identical to 'radio waves' - they just happen to be at 'wavelengths' which are 'shorter' than the radio spectrum. A light bulb (or the sun) is a source of lightwaves - think of either as a 'transmitter' and therefore directly related to a radio transmitter. Your eyes perform the same function with light that a radio 'receiver' does with radio transmissions.

Sound waves are also related to both radio and light which makes the crack of lightning or the shooting of a gun akin to a radio transmitter. Your ear(s) are therefore performing the same function as the radio receiver or your eyes - albeit at yet another range of frequencies. Radio allows sounds we can hear with our ears to be temporarily 'upconverted' to a new frequency - one our ears do not respond to - while the radio receiver reverses the process, extracting (demodulating is the technical term) the original sounds from the 'carrier wave' used by radio. There is a 'key phrase' in the last sentence: Carrier Wave (**1**).

Carrier wave equals spectrum

A 'carrier' wave is just that - a transmitter created signal (on a specified frequency) which can be used to 'carry' (as in transport) intelligence from one point to another (or many points). When a human voice is added to the carrier wave, the carrier wave becomes a 'vehicle' - carrying intelligence. The principal is identical to having a seat on an aeroplane, in a car, or boat. Your body occupies physical space and once the carrier wave has been modified by the 'intelligence' being transported, it then becomes an occupier of spectrum space. The amount of space so occupied is a measure of the 'bandwidth' required.

A telephone quality voice-grade range of sounds occupies only the bandwidth which corresponds to the carefully designed telephone network system - typically not over 3 kilocycles/kilohertz. The 'range' of frequencies transferred from a telephone instrument to a radio transmitter might begin in the vicinity of 50-70 hertz and end near 3 kilocycles/kilohertz. The bandwidth, then, is 3,000 cycles/hertz minus 50 or 2950 cycles/hertz. The human voice range, and the human hearing range, are typically bigger/broader/wider than this limited telephone instrument bandwidth - some people hear quite nicely down to around 30 hertz and as high as 15,000 hertz. Therefore it would be accurate to note the telephone audio system has been electronically 'shaped' (shaved, reduced) to carry only a portion of the full audible range our ears can hear or our mouths can generate. This 'bandwidth constriction' is an economic decision from the telephone system designers - by reducing the actual bandwidth allowed for a single telephone conversation, they are able to 'stack' (carrier-wave transport) a larger number of telephone calls with each carrier wave generated. Carrier wave? Yes, telephone systems are built around the same technology as your local radio (AM or FM) or even television station transmitters. And until very recently, all of this was done following the original 1909 'analogue carrier wave' format.

Bandwidth

Analogue, once you got through the basics, was easy to apply and comprehend. You began with a carrier wave on a specified frequency and then 'modulated' the carrier with some portion of a lower frequency. Going back to the telephone, if

1/ Carrier wave should not be confused with continuous wave which is often inappropriately abbreviated as 'CW' (as in Morse Code) which is anything but a 'continuous' wave.

the carrier wave was at 100.000 megacycles/megahertz, by applying a 50 to 2,700 hertz sound wave one of two things (each by design) happened:

1/ The '*amplitude*' of the carrier wave varies in direct proportion to the frequency and sound level of the new audio source. The carrier wave remains at 100.000 but the strength or power of the wave bumps up and down as the voice modulates the wave. This is termed AM for amplitude modulation.

2/ The '*frequency*' of the carrier wave varies (*deviates*) in direct proportion to the sound level and frequency range of the of the new audio source. The carrier wave actually changes frequency, directly in proportion to the 'modulating' signal and in our example it would vary from 99.973 (+2700 hertz equals 100.000) to 100.0027 (- 2700 hertz equals 100.000). This is termed FM for frequency modulation.

The AM version described also creates something known as 'sidebands' which appear either side of the original 100.000 and therefore expand the actual width occupied by the carrier wave by a factor of approximately 3 (99.973 to 100.0027). Each sideband actually contains all of the original modulation information so if you could eliminate one of the two sidebands, and even the carrier wave, and somehow still recover the one remaining sideband, the full original intelligence would be present in the receiver. This is the SSB (single sideband) variant of AM, popular for short-wave radio users but seldom used by anyone who needs a wider bandwidth.

Wider bandwidth?

All analogue carrier wave signals are bandwidth constrained by the 'modulating signal'. For a simplistic system transporting one human voice at a time, this is not much of a design challenge. But when one wishes to transport a full symphony orchestra sound (from below 20 cycles per second to more than 20,000) to a distant point, the limitations of AM quickly become a challenge. FM offered a wider bandwidth because *if* the user wished, the frequency spectrum being modulated could produce a larger response range.

The original premise behind FM was a desire to create a transmission system that was less likely to be interrupted by man made and natural static (such as the crash of lightning which creates havoc with AM). It turned out that by modulating the frequency rather than the amplitude, much more distinct and wider bandwidth sounds could be transported through a carrier wave. Yes, much of this was 'custom designed' to respond to the need to transmit a wide range of musical sounds but no amount of redesigning with AM would accomplish the same task within the limitations of the already established 'AM Broadcast Radio' service and the hundreds of millions of AM receivers already in existence when FM appeared.

A symphony was about as 'wide' (in bandwidth) as the designers of FM could encounter (in the mid 1930s when FM was developed). But just ahead on the horizon was an even tougher challenge; video.

Video: fitting the pieces together

Unbendable laws of physics pretty much define the minimum bandwidth requirements for transmission of a moving image. Although the earliest moving image video experimental transmissions managed to create at least an illusion of making an object move in real time, the image quality lacked smoothness (it was jerky) and detail (lacking definition). This presented the second problem - to transmit even this rudimentary video required as a minimum 1 megacycle of bandwidth (which is the same as 1,000 kilocycles or 1,000,000 cycles of space). Moreover, that megacycle had to be located where there would be no interference or lack of transmission stability. This pretty well ruled out using any megacycle below approximately 40 because of the 'short-wave effect' that existed in the lower numbers. Actually, this was a blessing in disguise because while it was need for large bandwidth that drove early video experiments above 40 Mc/s, it also happened by dumb luck to end up in a portion of the spectrum providing very smooth transmission albeit over relatively short distances (defined at the time as 'LOS' or line-of-sight).

From the initial moving video experimental transmissions (Los Angeles, New York, London) in the first half of the 1930s several limitations were discovered; the first was critical - defining the minimum 'resolution' (image detail) which would be acceptable to a viewing audience. The original tests were done with only 48 lines of vertical video detail and this limited imagery to working out objects totally black or totally white but not much else. A human face, for example, was a white glob with only a hint of indication where the mouth appeared. Resolution, or detail, was directly related to bandwidth allocated to video transmission. In faltering steps the British finally standardised on 405 lines, the Americans 525 and the French 819. The British bandwidth would end up being approximately half that of the French simply because more lines equalled more megacycles of space to transmit. It is of some interest to note that the 1940 French TV, experimental as it would be using the Eiffel Tower as a launch point, began with a 819 line image (755 'active lines') and today we consider 762 lines in digital format 'HD' (high definition).

There were other important decisions, possible only after various theories were reduced to functional hardware and field tested. Sound was one of these. In the UK and America, the video was AM (amplitude) modulated and at 405 and 525 lines respectively occupied bandwidths between 3 and 5 megacycles. The French would also settle on AM (after WW2) but they also did exceptional pioneering with FM (frequency modulation) of the image (abandoned because 819 lines frequency modulated appeared to require channel widths approaching 20 megacycles each; AM could be held to 8 megacycles width per channel including the audio subcarrier).

About which; *the audio*. Motion video without audio was a non-starter. The most direct way to create companion sound was generation of a 'sub-carrier' - one that would pass through the transmission system sort of as a hitch hiker to the main video carrier wave. The British adopted AM for the sound simply because in 1934-1935-1936, when BBC became serious about television, FM was mostly a laboratory curiosity and lacked real world field testing to confirm its' claims for superiority. World events would cause British TV to retain AM picture and AM sound for more than twenty years. The Americans, meanwhile, had fallen into a series of technical and legal disputes and while pioneers Don Lee (Los Angeles) and RCA (New York) might have quickly followed the BBC with regular television , it would be May 1941 before standards evolved. Standards were essential - without them there could never be mass produced, competitively priced receivers. At the very least the video and audio parameters had to be set by agreement or government decree. FM became the American audio standard largely because between the BBC's 1936 entry decision and the 1940 period, significant field trials had

proven the superiority of frequency modulation for at least the sound/audio portion.

Stuck with the numbers

Around these numbers the balance of the planning could proceed; 6 MHz wide channels in America (in response to the spectrum space required for 525 line video), later to grow to 7 MHz bandwidth channels as Europe adopted its own set of standards (625 lines which Australia and New Zealand would also adopt as later entrants in the television world).

However planning was not starting with a totally clean slate; whereas in 1940 as Europe plunged into war frequencies above 80 Mc/s were still considered 'experimental', by 1945 planners were actually designating specific uses and users to frequencies as high as 3,000 Mc/s (3 gigahertz/GHz in today's language); five years later, to 10,000 Mc/s. Out of the accelerated war development effort had come a myriad of new demands for bandwidth of which television was not a top priority. The decisions designating how portions of bandwidth between 80 and 3,000 Mc/s-MHz would be put into use (if not immediately, at some mid-near-term date) would be a framework firmly in place 60 years hence and these restrictions would hamper future development of new technologies. There are legacies here and we would all stumble over and through these ghosts for decades.

Universally, virtually every country introducing television made one early and near fatally flawed decision concerning how TV channels would be assigned to various areas or cities. The Americans are a prime example of how a lack of proper research would lead to chaos.

Initially the US set aside 13 TV channels each 6 Mc/s in bandwidth under the mistaken theory that no single area would require more than 7 (and then only the largest metropolitan areas - New York, Los Angeles) and by juggling the 13 channels around, all but the most barren western areas would end up with at least one TV channel. The fatal flaw part: Each of the 13 (in 1948, reduced to 12 which explains why there is not and never has been a TV channel 1 in America) channels would be used and reused. Someone with inadequate technical knowledge and no experience whatsoever made an arbitrary decision - stations operating on the same VHF channel (frequency) could be as near to another station on the same channel number as 160km/100 miles. Post war TV broadcasting resumed, barely, in 1946 but by mid-1948 the magnitude of this mistake was creating howls of protest. Whereas stations should have been 170-200 miles apart when sharing a common TV channel, the 100 mile 'spacing' lead to early viewers seeing lines of interference and interrupted sound when their 'local' TV station was but ten miles distant. In September 1948 all applications for new TV stations (fewer than 50 had actually begun broadcasting as of that month) were stopped. It would be mid-year 1952 before a new plan would be implemented.

To respace same channel stations (going from as close as 100 miles - same channel - to a minimum of 170 miles) immediately killed the original 1946 'master plan' that had begun with a clean slate. Post 1952, existing stations would be required to move to new channels, and areas which had been assigned one or more TV channels in 1946 suddenly found themselves with no TV channel(s). The answer was painfully obvious - sticking with the original 13 or 12 channels planned in 1946, there was no way more than 60% of the American landscape would ever have 'local' (defined as a TV transmitter within 50 miles/80km) TV. They were trying to stuff four litres of liquid into a two litre container.

The answer was 'more TV channels'. Unfortunately, between the 1946 planning of 13 channels and the 1952 realisation the requirement was for 50-60 or even more, the spectrum space between 80 and 3,000 megahertz had been spoken for and new uses and users were popping up weekly if not daily. Finding sufficient room for say 40 'new' TV channels was simple math: 40 times 6 (megacycles) equalled 240 Mc/s. They would eventually err on the side of over shooting the target - 70 new channels, 420 megacycles.

This was not a uniquely 'American problem' - they were simply the first to face the reality of moving into a brand new chunk of spectrum without any fore knowledge of what would happen when they arrived there. (2) The new bandwidth finally set aside for expanded television (initially termed 'upstairs television' because it was in the 470-890 Mc/s region) became its own version of field disaster. UHF technology in 1952, 1962, even 1972 was at best on a slow learning curve. A VHF station could count on serving a radius of 100km while technical limitations offered a maximum of 50km for most UHF channel telecasters. And although the 70 new UHF channels were officially available from 1952 onward, it would be twenty years before a law was passed mandating that any television set sold in the US must be not only able to tune-in the UHF stations but must do it "with the same comparative ease as a VHF channel." It would become a footnote in history that of the original 360 UHF stations granted permission to operate, within two years of these licenses being granted fewer than 50 survived. UHF stations were underpowered, under programmed, and ultimately a risky and poor investment.

What was largely unique to America was something called 'intermixture'; translated to mean most areas were assigned both VHF and UHF channels. The VHFs profited wildly, the UHF could not earn enough to even pay their power bills. Where hundreds of UHF stations invested and went on the air - and then left in bankruptcy, one VHF station suffered the same fate. What America was discovering, the hard way, is that a government bureaucracy was capable of designing standards which had no chance to function in the real world.

If the American bureaucracy 'did not get the message' very fast (it would be the late 1980s before this sorted out and UHF stations had a new opportunity to become competitive to their VHF counterparts), Europeans were fast learners. They simply shut down the early pioneering VHF stations, shifting them to UHF, where with careful planning most areas could have multiple channels of OTA television. VHF spectrum, never sufficient to allow total coverage for multiple channels even in smallish European countries, had been an unfortunate initial choice but in retrospect when the standards were created in the late 30s and 40s, it was the only game in town.

Cable and satellite impact

As early as 1938 the BBC's original London located TV transmitter was being 'piped' into homes using cable - well, *wire*. By 1948, coaxial cable (not the same as the early British

2/ The Americans were also the first to select a colour TV system - a CBS design that required a large mechanical spinning disc configured with colourful bits of plastic and driven by an electrical motor turning 12" screens into 30" cabinets. Mercifully, after years of debate they abandoned this technology for today's NTSC.

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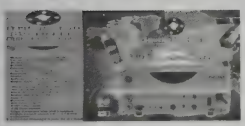

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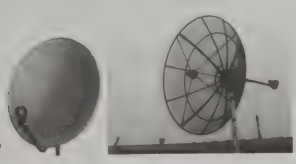

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'*wired*' systems) or something similar was linking one master reception antenna located where clear reception was possible to dozens, then hundreds and ultimately thousands of homes throughout areas in the states of Pennsylvania, Oregon and Washington. Early television, VHF of course, had appeared in major cities such as Seattle, Philadelphia, Los Angeles and what few comprehended at the time was that while a VHF station might interfere with reception at homes 100 miles/160km distant, others only ten or twenty miles from the transmitter could be blocked by nearby hills or mountains. In central Pennsylvania, major communities are strung throughout undulating terrain and virtually all had been built along rivers. On the hilltops, perfect TV reception but along the river bottoms where the people lived, nothing at all. It was a made-to-order business opportunity; 'plant' an antenna on the hilltop, run some cable, stick in a few amplifiers to compensate for cable losses, and tap it off to individual homes. *And get paid*; the TV was 'free' but the aerial connection was not. By 1970, 5 million US homes would be cable-connected. By 1990, more than 50 million; today - approaching 70 million and saturation.

Studies indicate only 13% of today's American households rely upon an aerial (rooftop, attic, set-top) for TV reception. And 66% are connected to cable, leaving 21% unaccounted for; satellite is the missing category. Satellite began in North America in 1979 and until the mid 90s was a C-band system built on top of more than a decade of political battles and copyright challenges. That was when the first Ku-band service appeared (DirecTV, later joined by DISH Network as a competitor). Satellite uplinks, cable systems now significantly depend upon direct (microwave or fibre) connections from local TV broadcasters - a relatively minor percentage of smaller cable systems located in rural areas still take over-the-air signals for distribution. America is an incredible mixture of all of these elements plus two more categories of service; 'translators' and 'LPTV' (low power TV stations). In the translator world one finds ten watt UHF band analogue 2-5 mile coverage 'repeater' stations carrying from satellite feeds some very strange programming indeed; Yale, Colorado is one such example where two of their ten local translator channels relay Canadian television from both coasts - Newfoundland and British Columbia, along with closer sourced programming. 'LPTV' is equally strange, originally created to allow minority (as in ethnic or interest - such as religion) groups to have a 'TV presence'. There are presently more than 3,000 such LPTV facilities (and over 2,500 'translator' class stations). And some of the 'low' power stations operate with tens of kilowatts of radiated power - many times greater than those original TV stations put on the air back in the late 40s and 50s. There is a bottom line to all of this.

1/ *Americans have an insatiable appetite* for more and more TV programming and there appears to be no limit to how many channels a serious consumer will judge adequate.

And the key which will lead us to digital; 2/ *under ever escalating consumer and commercial pressure*, the watchdog of radio spectrum has basically abdicated responsibility for interference free reception. The bottom line is, "proper frequency planning has disappeared and the way forward chosen involves simply killing all of the spectrum hungry analogue services and replacing each with digital modes."

<u>The digital arguments - pro</u>

Computers are digital (the 'one' and 'zero' thing) and computer monitors provide significantly higher quality video than any of the analogue TV systems; even the French 819 line. So - if digital works better, why should the world continue to follow a technological trail pioneered in the mid 1930s?

The dollars involved in transitioning to digital are essentially beyond computation. Ultimately, every device at the 'source' (the TV stations, networks, programming production firms, advertising creative firms - the list is endless) must be changed out; digital for analogue, down to the lowest piece of cable and switch. The intermediate transmission mediums starting with the transmitters, their companion antennas, through to the reception aerial, the receivers plus recording machines and even the cables interconnecting home devices will all be upgraded. It will be the single largest 'tip run' in the history of man; hundreds of millions of no longer useful analogue devices and parts. Imagine your own town's tip/dump receiving up to 4 (or more) analogue devices from each and every home, motel, hotel, bar-restaurant in the community. It is a mind boggling exercise which to date has gone essentially unanswered or studied or even understood by those responsible for such facilities (one recent US study revealed 2000 million tons of electronic 'garbage' is generated annually *in just one* geographic region - San Francisco).

Of course not every TV set (or recording device) will terminate its life when analogue switches off (February 2009 in the United States; 2012 in New Zealand and the UK, an uncertain date in Australia). That is where the transition devices - STB or set top boxes - enter the game. Say your home has one or more television sets and you are not today, tomorrow, perhaps not even in 2012 ready to invest in a flat widescreen display system. The STB is a temporary answer - by placing it in front of your TV receiver, or recording device, you will continue to use the existing analogue system in all of its glorious display artefacts.

But back to the reasons for digital. Bandwidth compression. Remember that for analogue TV we require 6 or 7 or 8 megahertz of spectrum. That's one TV programme (with sound), no more (well, stereo is possible but may require slightly more than the standard 6/7 or 8 MHz - encroaching into the next higher channel). Digital is a time-compressed mode, allowing you as a designer to mix 2, up to 8 perhaps, 'standard definition' (abbreviated SD) totally separate programme channels into a standard carrier width. '*Width*' is the *key word* here.

In the terrestrial world, as a hold over from the early beginnings of TV, there remain 'TV Channels' - each of which has an assigned frequency band. The now antiquated TV channel 'bandwidths' are being retained with the transition to digital; the same 6 or 7 or 8 MHz segments required for analogue and there is a message here. "*Bandwidth plus compression of digital services equals the maximum number of programming services which can be simultaneously broadcast.*" In other words, with the death of analogue the 6 or 7 or 8 MHz 'wide' channels could easily have been re-engineered to take advantage of the unique opportunities which digital compression offers. This was <u>not</u> done resulting in one last artefact from analogue staying with us after the transition.

'SD' (standard definition) is how we describe the existing analogue 'bandwidth' when transferred to digital. In a PAL region with 625 lines of video (576 of which are deemed 'active') the only difference between watching a programme in analogue or in digital is the 'signal to noise ratio' of the

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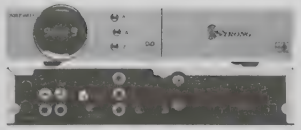
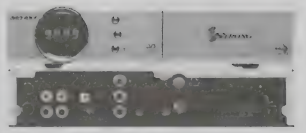
	SRT 4651X	 SRT 4653X	SRT 4654X	 SRT 4658X
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display. Signal to noise (S/NR) is a measurement to determine how much video image 'signal' appears on the display screen versus whatever noise (manmade or galactic) as may also be present. Analogue has the ability to display a discernible (although far from high quality) image with a S/NR as low as 20 dB. The normal goal is to create a minimum of 40 dB S/NR analogue image - a point at which only minimal noise (the 'N') is present, usually occurring when the *received signal* voltage is measured in the +60 dBuV region. There are two sets of parallel numbers here - the original 'as-received' signal (the one you measure with an appropriate signal level meter or spec an), and, the image itself where the S/NR is as discerned from the image painted on the screen. Repeating - a TV channel that measures +60 dBuV as a 'TV channel measurement' will, should, produce a video signal to noise of at least 40 dB on the screen.

Digital has the magic ability to begin with the original programme (print, tape, disc, camera) image and transfer the S/NR at that measurement start point all the way to the viewer's receiver more or less intact. A reasonably good 'source' can deliver a S/NR of 56 dB to the digital transmitter although the field performance is more likely to be in the range of 52-54 dB. Here we are dependent upon the original quality of the original video as it goes into the 'source' (transmission network). An early episode of Hogan's Heroes, for example, distributed originally on 35mm film, later transferred to 1/2" VHS or larger Beta format tape, might do well to achieve 48 dB S/NR. 'Digital remastering' of older material is possible, expensive and done only when the owners of the product believe there will be a market for the higher quality re-released product. Very few 'Three Stooges' episodes have been so converted!

So it is possible, even probable, that by merely switching from analogue reception in the 40 dB S/NR range to digital will instantly result in a 'cleaner' image (52+ dB S/NR) on the screen as anyone with a DVD player has already observed. There is a caution here - consumers can easily confuse 'higher S/NR' with 'higher definition'. The two are only marginally related. Higher S/NR is the most important by-product of the switch to digital; 'higher definition' comes only with added cost.

The original signal level

One of the basic arguments favouring digital relates to 'received signal level' - that 20 to 40+ dB thing that applied to analogue. A +20 dBuV (the uV part identifies this as a *measured signal level* as received from the reception antenna) signal is filled with noise ('snow' in TV talk) and the audio is likely to be 'raspy'. As the signal level increases, so does the on-screen image quality; more or less in 1 dB better input signal results in a 0.5 to 0.75 dB improvement in the on-screen S/NR. So if +20 dBuV analogue is 'watchable' and +60 dBuV is 'quality' then we have a 40 dB 'window' at the RF channel resulting in a 15-25 dB change (improvement) in the video signal to noise ratio.

Digital differs because it has a built-in 'threshold point'. There is no such thing as a 'snowy but watchable image' with digital. When the 'threshold' point is reached by the input signal level, there is an instant appearance of a 52+ dB S/NR video image. If the threshold is exceeded by say 10 dB (10 more dB signal level than required for 'digital lock') the video S/NR does not improve - it stays the same (as determined by the source's S/NR). Digital reception either works or it does not work. The only 'in between' state occurs when the input signal hovers/oscillates above and below the receiver's 'threshold point'. Here the reception flicks between gone (perhaps replaced by a blue screen or some clever warning text advising the signal is gone - as if you needed to be told that!) and perfect, clicking between the two states as the input signal floats up and down by a dB or less.

Pay attention now. Threshold is determined by the sensitivity of the reception device - whether a STB or a TV receiver with a built-in digital tuner-demodulator. The important part. The input signal level, as measured with a suitable digital signal level meter or spec an, needs to be someplace between +20 dBuV and +25 dBuV for 'digital lock' to occur. Those numbers again: +20 to +25 dBuV.

Thank back now to analogue. A +20 dBuV input signal will produce a snowy, perhaps watchable image and raspy sound. But the same signal level for digital will produce a video S/NR in the 52+ dB S/NR range. This identifies the second reason for transitioning to digital - each individual receiver requires fewer 'microvolts of signal' to produce an image and as we have already determined, the image will be significantly 'bolder' (better S/NR) than with analogue.

A bit more about threshold. There are 'digital parameter' decisions which impact on where threshold may occur with any particular STB or receiver. One of these is the symbol rate but the most important is the forward error correction (FEC). A transmitter using an FEC of 7/8 will require a higher (greater) threshold than one using FEC 1/2. In the terrestrial world, the difference between FEC 1/2 and FEC 7/8 can be as much as 3+ dB; a STB that would produce a fine image at +22 dBuV with FEC 1/2 might require a +25 dBuV signal for FEC 7/8. The broadcasting station elects which FEC to use and there are sound reasons for both 1/2 or 7/8 (or one of the sets in between these two extremes).

And the STB or TV set threshold 'sensitivity' issue. The earliest STBs seldom had a threshold better than the +25 dBuV signal level point while the latest approach a more sensitive +20 dBuV point. LG Electronics, through its' USA brand Zenith subsidiary, has a generation 'six' (6) chip which as these words are written appears to be the most sensitive for low threshold reception. But that is only a minor issue - at some point (and perhaps that point is +20 dBuV) the laws of physics take over and no further sensitivity - threshold improvement - is likely.

What this means to reception capabilities

With digital, any reception is automatically quality reception - short of hovering right at the threshold point with input signal level. Any signal level 'above threshold' is money in the bank - a savings account so that if reception conditions deteriorate or the equipment ages (as it surely will) a few dB reduction in input level will not cause the reception to 'sputter' and stop. At the transmitter/origination end of the circuit, transmitter power levels can be (will be, are being) reduced simply because receivers no longer require +40 dBuV (analogue) to produce pretty pictures; +25 dBuV will do just fine, usually. In soft numbers, where a 100,000 watt transmitter was required for analogue, a 10,000 watt digital transmitter will now do the same basic task. This means lower capital and operating costs for the 'source'. However, at the same time their transmission power can be reduced, they are replacing virtually every piece of hardware and cable with digital rated items - their short term capital savings will be few if any.

Out in the field, 'digital perfect' will (as it has world-wide) be elusive for the first dozen or so installs. There are new lessons

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to be learned concerning the use of connectors, signal splitters, even the rating and type of cable used. The digital reception threshold may be easier to meet than analogue for 'perfect reception' but the 'cliff' that exists (no reception, perfect reception all within a +/- 1 dB or less signal range) can be a struggle initially. Digital works less well at VHF than UHF, a function of interference from extraneous sources which is more common at VHF than UHF (common household appliances, for example, especially new generation SMPS - switch mode power supply - devices are especially troublesome). On the flip side, signal 'splitting' (one antenna, two or more receivers connected) and signal amplifiers (raising the received signal - voltage - level) used for multiple outlet installations can be especially troublesome. A few of the early lessons to learn:

1/ Too much signal (such as +60 dBuV or greater) can cause loss of reception (it seems some STBs have not only a 'threshold' but a 'ceiling' where too much signal causes the same problem as too little).

2/ Signal splitters must be at least rated for the band in use (UHF or 900 MHz for example for UHF) and unused outputs should be terminated with a 75 ohm resistor (available as a screw on device for unused F connector ports on a splitter).

3/ PAL type connectors can be very troublesome - it is far safer to use only F connectors and devices which are so equipped. This is especially true at UHF.

All of this has been covered in detail in previous issues of SatFACTS.

And the 'HD' step

If broadcasters had their way, all consumers would immediately rush out to acquire one or more 'High Definition Compatible' TV receivers. The position on 'HD Capable recorders' is less unanimous.

First of all, high definition is not created at a TV receiver; it originates at a transmitter (or on a DVD). The receiver replicates (recreates) the HD information but only when:

1/ The receiver and the transmitter are using compatible HD technology

2/ The software in the receiver is compatible with the 'instructions' coming from the transmitter

3/ In the situation where the HD passes through a HD rated STB, appropriate connections have been made between the STB and the receiver.

A 'widescreen' receiver (16 x 9 ratio of horizontal width to vertical height) is not automatically 'HD compatible' - in fact if it is more than a year old, the odds are it is not and never will be capable of true HD displays. Unfortunately many consumers purchased their widescreens under the mistaken belief that "16 x 9 widescreen automatically equals high definition television."

HD is an 'add on' to digital; *an optional extra*. The 'option part' begins with the broadcaster who on a show by show, programme by programme basis can elect to broadcast in standard definition (SD) or HD. Even within a show, such as a newscast, material transmitted can and will flit without ceremony from SD to HD and back again. The reason for this is straight forward; not all material available, locally or from overseas sources, arrives in HD and while some (not all) SD can be station-reconfigured from SD to a HD look-alike, there is not always time nor money available to do this.

Now the real hang-up. HD requires more bandwidth (space within the TV channel) than SD. The exact amount HD requires depends upon how the origination point has played with the 'compression' equipment but generally if a station/source elects to broadcast in HD, they are using the equivalent bandwidth which could have been occupied by 4 or more SD programmes.

Remember that terrestrial TV channel has defined limits - 7 or 8 MHz which can be thought of as a 7 or 8 litre container. The station can 'fill it up' with one HD and perhaps 1 or at most 2 SDs or it can fill it with up to 6 SDs.

Now place yourself in the position of business manager for XYZ-TV and you have the technical option of running "The World's Greatest Movie" in HD as a block buster presentation. Within your 7 or 8 MHz, that will leave you with enough space to also run one SD as well at the same time. *Decision time*. If you run the movie only in HD and a second totally different programme in SD, your channel is 'full'. But - only homes with the 'full HD Monty' will be able to watch the blockbuster film. Now let's assume only 5% of the audience has acquired 'the full HD Monty' - is it worthwhile to tie up your HD capability for a maximum 5% of the audience? Option two: Run the movie in HD and on SD as well - now 100% of the homes with DTT can watch although some (in theory) - that 5% - will enjoy it to the fullest.

When colour was introduced, it was a 'compatible system' which denied reception to no one; those with colour receivers saw colour, those without saw the same film in black and white. No viewers missed out. Digital offers the station new options, new opportunities to 'drive the take-up of HD' by running programming in HD as an incentive to viewers to rush out and purchase the magic collection of equipment which will make HD reception possible. But unlike the addition of colour, viewers will not automatically receive the program in SD - not unless the station finds it commercially expedient to create a programming schedule that drives the process. The longer and more often the broadcaster runs in parallel the same shows in both HD and SD the smaller the incentive for consumers to rush into the HDMI/HDCP world of regulated HD reception (see SatFACTS #159, p. 8).

Remember - it is not the receiver which creates HD - it is the broadcaster. And that brings us to the HDMI/HDCP squabble.

SatFACTS covered this subset in some detail as noted above. The problem or challenge is this. Recording. After the USA legal challenge against Sony (the so-called 'Betamax Case') home video recording became a must-have technology. The programme owners accepted this decision very reluctantly and vowed it would not happen again. Here were millions and millions of folks recording 'Seinfeld' or League Rugby and those recordings fell outside of the copyright control world. As it happened, while it is possible to dub and redub (and re-redub) VHS recordings down to perhaps a fifth generation copy and still have viewable video, the quality after the original (which was not that good to begin with) rapidly deteriorated. It was that S/NR thing - each time a new dub of a dub was created, the signal to noise ratio went down to the point that after perhaps five dubs the control (synch) and video quality had gone to heck in a hand basket. In other words, the system was (is) design flawed which makes large scale copying of programming less than a commercial opportunity.

Now along comes digital where the signal to noise ratio is 52/54 even 56 dB to start with and because of the digital parameters copy 5, 500, 5,000 all the same; deterioration no longer is an element in the equation. Naturally the firms that own copyrights were frightened by this technology - how many people would rush out to purchase a copy of 'Seinfeld' when it

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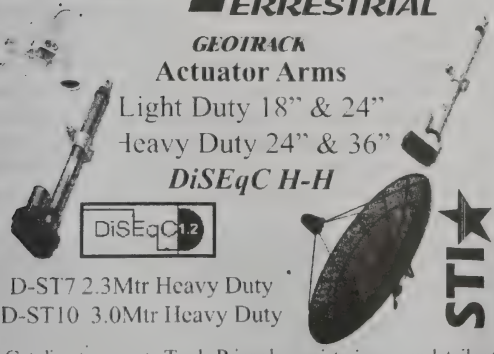

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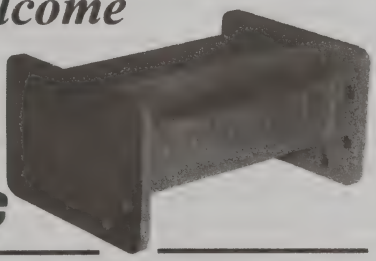

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could be taken directly off the DTT (or DTS) air, recorded and then copied infinite times without loss of quality?

HDCP (high definition copy protection) and HDMI (high definition multimedia interface) were created to 'correct' this challenge. The initial target has been the STB world - the device resting atop the TV, connected to the aerial at one end and the TV receiver at the other. In theory, the STB can create either or both of two outputs to connect to the TV receiver. Number one would be an analogue output, limited because it is analogue, to not more than 44 dB S/NR (this could be in either component, composite or UHF remodulated signals). No real problem here - 44 dB and analogue translates to "You won't copy and recopy this very many times before the image goes to hell". But the other output - 'digital!' - oh, *wow*! Here it sits, in pristine 52/54 even 56 dB S/NR and still in digital data stream form. With an appropriate recorder (not your home VHS unit), make a zillion copies and each will be as good as the original signal. The programme rights owners response was, "Fix that - *don't let it happen*."

HDMI is the digital transfer medium. It allows the digital format data stream to be linked to the TV set. And this requires an HDMI connector (see SatFACTS # 159, p. 8). This 'data stream' remains in a digital format - the signal through the HDMI connector on the back of the STB has not been fully processed - it is being transferred (encrypted) while as digital directly into the TV receiver's companion HDMI socket. It is assumed there is a HDMI cable (of the correct configuration - several varieties exist and having the proper one for the STB + TV receiver is key here) as well. The actual decoding (video creation) of the digital data stream now takes place within the TV set.

(If the STB is so-equipped, there will be analogue demodulated signal[s] as well either at component, or composite output jacks on the rear of the STB. These, analogue, can be linked to an analogue VCR [recorder] or if the TV set does not have a HDMI socket, directly to the TV set. There may also be a UHF remodulated output on the STB - a piece of coaxial cable from the 'Antenna/UHF out' PAL or F connector to the TV set's PAL or F connector will allow the viewer to see the picture in glorious analogue SD as well.)

Meanwhile - back at the TV broadcast point, someone has sent additional data stream information with the TV stream telling the receiver whether it is legal/possible to record the programme. This data stream, through the HDMI fitting, ends up at the TV receiver in the HDCP (high definition copy/content protection/protocol) software chip. If the origination point has so decided, HDCP will prevent you from recording the programme in its pristine (HD) digital format. That does not preclude you from using the component/composite /UHF redmodulated output to record it in analogue (you see - there IS a reason not to throw away 'old style' analogue VCRs!). But as long as the HDCP 'flag' is turned on, you won't be making a digital recorder recording of the programme.

The opportunities for 'hacking' here are unending. This is just the launch point for an angry response from folks like you who see this as a trespass on reception rights. Think big - have fun - this one will become very large in the hacking world quite soon. But for the average consumer, well - make an analogue recording and put up with the fact that on your own TV display, connected into 'input two' or whatever as composite or component or UHF remodulated, it will look just fine for time-retarded or repeat viewing. Only - and this is the biggie - *it will not be in HD*.

Our broadcasters, the folks providing the transmission 'service', are caught between a large rock and a very hard place. If - IF they wish to rent/hire/show a particular programme and IF their use agreement includes a provision limiting 'digital reproduction' they have no choice but to turn on the 'HDCP flag'. That's the data sequence which limits any (and all) digital copying. The viewer is at the far end of the line - subject to whatever HDCP instruction as the programme supplier may require.

Key here is that 'digital recording' is the restricted function. At this stage, analogue recording is not although if the programme rights owners had a choice, it would also be limited. What this translates to is as follows:

1/ Time shifting will remain possible, but HD time shifting may not be.

2/ Sharing of recorded material with others will be limited to analogue format.

3/ Control of what is recorded, by whom, when and where will shift from the consumer to the programme originator.

The missing ingredient: digital recorders

When HDMI (and later HDCP) were initially made public (2002) a number of proposals were discussed. One would have restricted to 24 hours the 'time limit' between recording a HD programme and watching. Another would have restricted viewing to a single time (after which the file would go away) while a third suggested a 7 day reviewing period and up to 3 reviews before the show evaporated. None of these suggestions found much support from the public. 'Sharing' (transferring the file to a second party) was largely a no-no, a line in the sand which no rights owners wished to cross.

TiVO and Replay TV appeared in the (US) marketplace - allowing longer term retention and as TiVO has matured, remote access via Internet to home recordings. The rights people were not very pleased about either system but no serious lawsuits have been filed.

DISH TV introduced a competitive system (2002) with a 'watch one channel - record another' twin tuner home satellite box; more than 200,000 were sold the first year. But you would not be transferring material outside of their custom box - *home viewing only*. Hackers and others have been able to modify TiVO boxes to allow box use in countries not supported by TiVO's important programme guide service.

One of the primary advantages to VHS recording is the ability to select one channel to record while the TV set is tuned to a different channel for viewing. With any of the planned DTT STBs (for New Zealand), the user will select a single channel (whether for viewing live or recording); a second channel tuner is not initially offered. The second advantage (and it is difficult to determine which of the two is more important) allows removing the VHS cassette and loaning or taking it to another location for viewing. You won't be doing this so conveniently with a hard drive recorder (models created before the HDMI/HDCP format evolved do offer both a hard drive plus DVD recorder).

All of this suggests ingrained viewer habits will be forced to change after several decades of VHS recording versatility. And the threat of legal action or worse against any firm offering technical solutions, from the rights owners, is the root cause. Colour took ten years to take gold - HD digital could easily stretch out just as long to come to fruition.

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MPEG-2 Decoder	Yes, Embedded
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Constellation Diagram	Yes, for QAM
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SatFACTS Pacific/Asian MPEG-2 Digital Watch: 22 Jan, 2007

Bird	Service	RF/IF &Polarity	# Program Channels	FEC	Msym	Receivers and Errata
Thcm5/78.5	SkyChAust	3695/1455H	up to 3	3/4	5(000)	CA (#1, 3), FTA audio #2
	ANT Greece	3672/1478H	1 TV	3/4	13(333)	Late July 04 room for more (FTA)
	TARBS ME mux	3640/1510H	12TV, 12 radio	2/3	28(066)	CA + 23FTA(A1TV, IRB3, Vision Norge,Pakistan)
	Ch Nepal	3626/1524V	1	3/4	15(556)	New 03/03, FTA
	Mahar mux	3600/1550H	11TV, 1 rad	3/4	26(667)	Thai + Indian services, FTA inc Vibe TV, Sindh TV
	RR Sat mux	3551/1600H	8TV,10 radio	3/4	13(333)	3TV, 5radio inc Hellas TV Greece FTA
	TVK Cambodia	3448/1702H	1TV	1/2	6(312)	**FTA**
	TARBS/Th5	3480/1670H	12 TV+radio	2/3	26(667)	**3FTA** TV5, VTV4, ATN Bangla
	Thai Global	3425/1725V	up to 7?	2/3	27(500)	FTA (reaches SE Australia)
InSat 2E/83	**ETV mux**	4005/1145V	6+ TV	3/4	27(000)	Several ETV now here, wide beam
	Hyd Dig 2E	3910/1240V	1	3/4	5(000)	SCPC, OK E Aust wide beam
	Kairali TV	3699/1451V	1	3/4	3(184)	SCPC, OK E Aust wide beam
	Indian mux	3643/1507V	3	3/4	19(531)	corrections 12/02
	Sky Bangla	3430/1720V	1TV	3/4	6(000)	New - November 2002
NSS6/95E	Ant Pac (Greek)	11 104H-Australia	1 TV	3/4	2(800)	Now CA, was 11 083H
As2/100.5E	**Guangdong TV**	4075/1075H	1TV + radio	3/4	6(000)	July 04 FTA
	Euro Bouqt	4000/1150H	5TV, 19 radio	3/4	28(125)	FTA TV + radio, LUXE TV HD here
	SatLink	3960/1190H	3TV	3/4	27(500)	(Real Madrid left July 2007)
	Reuters News	3905/1245H	1TV	3/4	4(000)	Was 3923H, sometimes **FTA**
	WorldNet	3880/1270H	4+/18radio	1/2	20(400)	FTA, multiple audio services V2360, A2320
	APTN Asia	3799/1351H	1	3/4	5(632)	Sometimes **FTA**, also 3895Vt
	Reuters/Sing	3775/1375H	1	3/4	5(631)	**FTA** & CA
	Macau MUX	4148/1002V	5TV	3/4	11(850)	5 chs TV, FTA, some tests
	Dubai MUX	4020/1430V	4+, radio	3/4	27(500)	FTA , Dubai Sports Ch some English, soccer
	Russian/Israel	3832/1318V	up to 4 video	3/4	7(271)	Two Israel, two Russian (REN-TV)
	ArabSat#2	3820/1330V	8+ video?	3/4	27 5	New 07-06, 10 FTA here
	Trace TV	3792/1358V	1	3/4	2(400)	new here Dec 2004, Euro-French music videos
	BYU-TV	3767/1383V	1 + 20 audio	1/2	6(530)	Increased coverage, great variety audio chs(03-05)
	3-ch miniMUX	3752/1398V	up to 3	3/4	5(640)	Sun-TV, Surya TV, KTV (FTA)
	Saudi TV1	3660/1490V	7+/tests	3/4	27(500)	FTA MCPC, Yemen, MBC EUROsport tests
Express2/103E	**Various-tests**	3675/1475R	2	3/4	4(340)	Now loaded from 96 5E, svrl below 3900 all RHC
As3S/105E	**Chinese regionals**	3671/1471V	2	3/4	8(932)	New 07-06, Yanbian, Jilin Satellite TV
	CETV digital	3680/1470H	1+ TV	3/4	26(670)	replaces analogue same freq, V33, A32
	Zee bouquet	3700/1450V	10TV	3/4	27(500)	Now SECA 2 CA (10-04), Radio Aust Eng A2011
	Ch News Asia	3706/1444H	1TV (+)	3/4	6(000)	English + V1160, A1120, 525, 625 versions
	Azio TV	3716/1434H	1TV (+)	3/4	7(000)	Was parallel to 3640Hz analogue (now gone)
	TVB 8	3729/1421H	1TV	3/4	13(650)	
	Zee Movies	3732/1418V	3TV	3/4	6(500)	Conax CA, all Hindi films
	TV One	3739/1411V	1TV	3/4	2(8934	Also reported 3 333, ¾ October 2005
	SAB TV	3743/2407V	1TV	3/4	3(300)	SAB may no longer here here, moved to NSS-6?
	Fashion TV	3747/1403V	1TV	3/4	2(625)	new frequency October 2005
	AAJ-TV	3750/1400V	1TV	3/4	2(820)	New April 2005, English, urdu
	Arirang TV	3755/1395V	1	7/8	4(418)	FTA SCPC, New PIDs V3601, A3606 June 2003
	Now TV +	3760/1390H	up to 10TV	7/8	26(000)	CA + 10 **FTA**, DW, TV5, Al Jazeera English
	Star TV	3780/1370V	7(+)TV	3/4	28(100)	NDS CA (Pace DVS211, Zenith)
	Pakistan	3786/1364H	2TV	3/4	5(700)	Was 3647V, TV One & Waseb TV
	GXTV	3806/1344V	1TV + 3 radio	3/4	4(420)	Guangxi TV, was As2
	Shaanxi TV	3813/1337V	1TV + 2 radio	3/4	4(420)	Was As2
	Anhui TV	3820/1330V	1TV + 2 radio	3/4	4(420)	Was As2
	Jiangsu TV	3827/1330V	1TV + 2 radio	3/4	4(420)	Was As2
	HLJTV	3834/1316V	1TV	3/4	4(420)	Was As2, HeiLong
	Star TV	3840/1310H	7(+) TV	7/8	26(850)	NDS CA (Pace DVS211, Zenith)
	Star TV	3860/1290V	5(+)TV	3/4	27(500)	NDS CA (Pace DVS211, Zenith)
	Dragon TV	3886/1264V	1 TV	3/4	4(800)	Shanghai
	Shaandong	3895/1255V	1TV + 6 radio	3/4	6(813)	Apparently Mongolia
	CCTV1	3904/1246V	1TV, 1 radio	7/8	4(420)	
	Jilin TV	3914/1236V	1TV + 2 radio	3/4	4(420)	
	Star TV	3920/1230H	4+ TV	7/8	26(850)	
	CNNI	3960/1190H	8TV, 1 radio	3/4	27(500)	PowVu CA; new SR Apr 29, CNN radio **FTA**
	StarTV	3980/1170V	6+TV	3/4	28(100)	NDS CA, Star News India **FTA** VPID 514, APID 648
	Star TV	4000/1150H	8(+)TV	7/8	26(850)	NDS CA w/ **4(Chinese) FTA**
	Sahara digital	4020/1130V	8TV, 1 radio	3/4	27(250)	New Sr September 2004
	Hubei TV	4035/1115H	1TV + 2 radio	3/4	4(420)	Was As2
	Tianjin TV	4046/1104V	1TV + 2 radio	3/4	5(950)	new December 2004
	Sichuan TV	4051/1099H	1TV + 1 radio	3/4	4(420)	Was As2
	Qinghai TV	4067/1083H	1TV + 2 radio	3/4	4(420)	Was As2
	Hunan TV	4082/1068H	1TV + 1 radio	3/4	4(420)	Was As2
	Fashion/HK-Asia	4088/1062H	1TV	3/4	2(626)	New July 2005
	Pakistani TV	4091/1059V	4TV, 1 radio	3/4	9(330)	new Sr, channels, April 2006
	Sun TV	4095/1055H	1	3/4	5(554)	"History Channel" - SCPC, some English
	PTV National	4106//1044V	1TV, 1 radio	3/4	3(333)	
	TVB8 Mux	4111/1040H	4 TV	3/4	13(650)	MATV Ch Movies now Irdeto 1
	Indus News	4115/1035V	1	3/4	3(331)	Hindi (+ "Plus"), day parts
	CCTV bqt	4129/1021H	4 TV, 4 radio	3/4	13(240)	moved from 4115
	Zee Bqt #2	4140/1010V	8(+) TV	3/4	27(500)	Now SECA 2 CA (10-04), 1 occ FTA (varies)
	Henan TV	4166/984V	1TV + 8 radio	3/4	4(420)	Was As2
	Fujian TV	4180/970V	1TV + 2 radio	3/4	4(420)	Was As2
	Jiangxi TV	4187/963V	1TV + 2 radio	3/4	4(420)	Was As2
	Liaoning TV	4194/956V	1TV + 2 radio	3/4	4(420)	Was As2
Cak1/107.5	Indovision (S-band)	2.535, 2.565, 2.595, 2.625, 2.655	33(+) TV	7/8	20(000)	NDS CA using RCA/Thomson, Pace IRDs, **2.535 has 2 FTA**, Bird now inclined
T.Kom/108E	**IndoBqt**	3460/1690H	up to 6	3/4	28(000)	also 3586H/17.500, 3496H/19 615
C2M/113E	**TPI**	4185/965V	1	3/4	6(700)	**FTA SCPA**; NT/NC only
	Anteve	4144/1006V	1	3/4	6(510)	change from 4055V, FTA SCPC
	Kabelvision Mux	4080/1070H	7+ TV	7/8	28(125)	also try 3500H, 27 000, 3/4, strong NZ
	Indostar	4074/1076V	1	3/4	6(500)	New (but probably temporary) 07-06
	SCTV	3934/1216H	1	3/4	6(620)	**FTA**, may not be active full time
	Indo MUX	3880/1270H	3+ TV	7/8	28(121)	**FTA**; Sr change 01/03, erratic
	KBS World	3838/1312V	1TV		2(100)	New August 2007, note low res rate
	TVRI	3765/1385H	1TV	3/4	5(555)	bounces btwn FTA and CA, unreliable (12-04)

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Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
	SCTV	3726/1424V	1TV	3/4	6(.620)
	RCTI	3473/1677H	2	3/4	8(.000)
C6B/115	**See**	SF#156	p. 29	for interim	update
As4/122	**CCTV MCPC**	3820/1330V	8	3/4	27(.500)
Sin3/125	**Tests**	3989/1161H	1	3/4	9(073)
Jc3/128	Miracle Net	3996/1154V	3 up to 6	5/6	22(.000)
	Asian bqt	3960/1190V	up to 8	7/8	30(.000)
Ap6134E	Multiple	4140/1010V	up to 8	7/8	27(.500)
T18/138	**Tests**	3460/1690V	8	3/4	30(.000)
Am3/140	**STS +**	3731/1419R	1	3/4	3(.200)
MeasSs2	**Astro Mux**	11.602H	up to 17TV	3/4	41(.500)
B3/152	**7 Cent. Feed**	12.310H	1TV	3/4	5(.100)
	AuroraBiz	12.407V	4 TV, 10 radio	2/3	30(.000)
	UBI	12.394H	13 TV + 13 radio	3/4	22(.500)
	UBI	12.421H	13 TV	3/4	22(.500)
	Globecast 2	12.525V	13 TV, 8 radio	2/3	30(.000)
	ABC feeds	12.538H (+)	1TV	3/4	6(.980)
	Globecast	12.564V	2+ TV	2/3	30(.000)
	UBI	12.581H	13 TV, 13 radio	3/4	22(.500)
	UBI	12.608H	13TV, 13 radio	3/4	22(.500)
	UBI	12.644H	13TV, 13 radio	3/4	22(.500)
	Globecast 1	12.657V	13TV, 13 radio	2/3	30(.000)
	UBI	12.671H	13TV, 13 radio	3/4	22(.500)
	Globecast	12.706V	Unknown	3/4	22(.500)
	Globecast	12.733V	Unknown	3/4	22(.500)
C1/156E	Aurora	12.324V/T1U			
	Pay TV	12.365V/T2	11TV, 2 radio	3/4	27(.800)
	Aurora Home	12.407V/T3	5 TV, 13 radio	2/3	30(.000)
	Pay-TV	12.447V/T4	5TV, 4 data	3/4	27(.800)
	Pay TV	12.487V/T5	3+ TV, data	3/4	27(.800)
	Aurora 2	12.527V/T6	7TV, 20 radio	3/4	30(.000)
	Pay-TV	12.567V/T7	10 TV	3/4	27(.800)
	Pay-TV	12.607V/T8	10 TV	3/4	27(.800)
	Pay-TV	12.647V/T9	10 TV	3/4	27(.800)
	Pay-TV	12.692V/T10L	6TV, 27 radio	1/2	28(.650)
	Aurora MUX	12.728V/T10U	4TV, 17 radio	1/2	24(.450)
	Austar	12.305H/T11	6TV, 24 data	3/4	30(.000)
	Pay-TV	12.358H/T12	10 TV	3/4	27(.800)
	Pay-TV	12.398H/T13	10 TV	3/4	27(.800)
	Pay-TV	12.438H/T14	6TV, 3 data	3/4	27(.800)
	Pay-TV	12.478H/T15	10 TV	3/4	27(.800)
	Pay-TV	12.518H/T16	10 TV	3/4	27(.800)
	Pay-TV	12.558H/T17	10 TV	3/4	27(.800)
	Pay TV	12.598H/T18	10 TV	3/4	27(.800)
	Pay-TV	12.638H/T19	10TV, 30 radio	3/4	27(.800)
	Pay TV	12.688H/T20	11TV	3/4	27(.800)
D1/160E	Sky NZ test	12.394H	TV +	3/4	22(.500)
	SBS west	12.407H	TV+	5/6	12(.600)
	WIN + GWN	12.424H	2TV		14(.294)
	Freeview NZ	12.456H	TV+	3/4	22(.500)
	Sky NZ	12.519H	TV+	3/4	22(.500)
	Sky NZ	12.519V	TV+	3/4	22(.500)
	ABC NSW	12.514H	TV	7/8	14(.294)
	ABC South	12.532H	TV	7/8	14(.294)
	ABC Northern	12.550H	TV	7/8	14(.294)
	ABC Western	12.577H	TV	7/8	14(.294)
	ABC Victoria	12.595H	TV	7/8	14(.294)
	ABC Qld	12.613H	TV	7/8	14(.294)
	Austr Mux	12.643V	TV, radio, data	3/4	6(.874)
	Feeds	12.670V	TV	3/4	6(.670)
18/166E	SelecTV	12.526H	8+TV	3/4	28(.800)
	CCTV	12.557H	3+TV	3/4	13(.240)
	ABS-CBN	12.575H	4+TV, 4+ radio	2/3	13(.845)
	MYSAT	12.646H	up to 8 TV	3/4	28(.066)
	JEDI/TVB	12.686H	11+ TV	3/4	28(.126)
	PnGlobal Aust	12.726H	6+TV	3/4	28.(066)
	ABC A-P	4180/970H	2TV, 2 radio	3/4	27(.500)
	Disney Pac	4140/1010H	typ 6 TV	5/6	28(.125)
	NHK Jobo	4060/1090H	7TV, 1 radio	1/2	16(.180)
	FOX Mux	4040/1110V	up to 5TV	7/8	26(.470)
	NET +	4121/1029V	1 TV	3/4	4(.774)
	ESPN USA	4020/1130H	8+TV, data	3/4	26(.470)
	Discovery	3980/1170H	8 typ	3/4	27(.690)
	CalBqt/Pas8	3940/1210H	up to 3+ FTA	7/8	27(.690)
	CNBC HK	3900/1250H	up to 7TV	3/4	27(.500)
	FilipinoMUX	3880/1270V	up to 8TV+radio	5/6	28(.694)
	CCTV Mux	3829/1321H	up to 4 + 1 radio	3/4	13(.240)
	TVBS-N	3836/1314V	**1FTA**, 4+ CA	3/4	17(.500)
	EMTV PNG	3808/1342V	1 + 2 radio	3/4	5(.632)
	CNNI	3780/1370H	3, up to 5 TV	3/4	25(.000)
	Discovery Asia	3764/1386V	Up to 6 TV	3/4	19(.850)
	MTV	3740/1410H	8	2/3	27(.500)
I2/169E	WA Mux Pv	12.281V	3+ TV, radio	2/3	27(.500)
	Ariang TV	12.401V	1TV	3/4	4(.400)
	ABS-CBN	12.575H	4TV, 2 radio		13(.845)
	Test mux	12.715H	6+ TV	2/3	30(.000)
	TARBS feeds	4090V/1060V	9TV + radio	3/4	21(.000)
	BBC SCPC	3986/1164H	1TV	1/2	5(.700)
	Middle East	3836/1314V	4 typ	3/4	13(.331)

Receivers and Errata

was on 4048V, New Caledonia, parts of Australia
FTA SCPC;or, 3774H, 6.520, ¾ (June 06)
Services/bird new August 1, 2007
also: 3820V, 3940V,4100Vin blindscan
Tests, coverage unknown, Hz only? 09/07
PowerVu; some **FTA** (Ch. 1 & 3)
CA & FTA NTSC: Japan, Taiwan
scan 3500-4200 V+H, analogue 3860V
also try 3660/3540VVt, Sr 30.000, 3/4; some FTA
North beam, also try 3875R, 12.475, 1/2
Aust East beam - **3 FTA** + 14 CA

D2 will replace 22 January 2008
differs from 12.407 C1, **tune ch FTA; NZ+Au**
New Dec 2007; **'Info' FTA**
New Dec 2007; **ITN, Aghapy FTA**
NZ + Au, FTA + Mcrypt CA
3 feeds 12.538H, .545H & .555H
AMTV, Healing only FTA svcs now here
New Dec 2007; all CA
New Dec 2007; **ERT, KTV, SCTV FTA**
New Dec 2007, all CA, NIT 'home'
High performance beam, not NZ, new CA 07-06
New Dec 2007, all CA
New Jan 2008, unknown use
New Jan 2008, unknown use
not currently in use
Tests; SBS-NDS CA, others FTA when here
NZ (90cm) + Australia **(Only C1 svc left on NZ)**
Australia NA only (leakage to Norfolk, New Cal)
Australia NA only (leakage), 9-Net x 3 widescreen
Arrow radio (still here), tone FTA
Pay-per-view movies, CA
Pay-per-view movies, CA
Pay-per-view movies, CA
ABC for Foxtel/Austar, previously 12.288V
changes September 2005
Austar inter, **Expo FTA**
NDS CA + Mcrypt, CA
CA, subscriptions available Australia, Norfolk
Sky News active, 'Help x 2' **FTA**
CA, subscriptions avail Au, Nrflk, **TVSN FTA**
CA, subscriptions available Australia, Norfolk
"Home"CA, subscription available Australia, Nrflk
CA, subscriptions available Australia, Norfolk
CA, subscription available Australia, Norfolk
CA, subscription available Australia, Norfolk
+12.451H/SE, 12.469H/Qld, 12.487H/south
Previously B3, 12.737V (Dec 2007)
+12.483H
+12.546, 581, 608, 644, 671,707, 734(all H)
Australia + NZ beam, SKY tests
Australia only
Australia only
Australia only
Australia only
Australia only
Australia only
Dual beam (Australia & NZ), V8 other feeds 08/07
.
& 12.286, 12.326
FTA-Australia
CA -Australia
FTA V=5340, A=790 -Australia
June 2002-Irdeto-2 CA - Australia
Some **FTA**-Australia
Dateline west, also east PAS2, 3901V
PowVu CA
PowVu CA **& FTA**; sub available-changes 05-06
was PAS-2, previously 3992Vt; **feeds FTA**
NET25 + FTA; new PIDS April '03, reload
PowVu CA; ch 11 DCP-CCP bootload, audio **FTA**
PowVu/CA (some audio **FTA**)
PowVu CA **& FTA (EWTN + CBS +TBN +)**
NDS CA (6 channels), one test card occ FTA
Myx FTA V1960, A1920 + radio FTA
PowVu FTA, replaces PAS-2 svc
CCTV cross pole; new SR 04-06
PowerVu CA
PowerVu; some audio **FTA**
PowerVu; Asian MUX; new parameters Nov '03
 # 8 MTV China FTA V289, A290; rest CA
PowVu CA, WIN, ABC NT, SBS, status unknown
Test - may not stay permanently
Temp **FTA**; subs Aust 011-800-2270-0722
initially with 6 NTSC colour bars
Occ **FTA** (Chile +), BIG power reduction Nov 03
BBC World moved here January 2005
Subscriptions available; Strong Technology

Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
(PAS2/169E)	**Adventists.tv**	4040/1010H	1	2/3	5(900)
	Feeds	3868/1182H	1	2/3	6(620)
	Feeds	3939/1211H	2 (typ NTSC)	2/3	6(620)/7(498)
	Cal PowVu	3901/1249H	up to 8	3/4	30(800)
	HK bouquet	3850/1300H	up to 8	2/3	24(900)
	Korean Bqt	3771/1379H	1	3/4	6(510)
AMC23/172E	**Various-tests**	12 730H	up to 8	3/4	30(000)
I804/174E	**iPSTAR**	12 619H	1	2/3	25(220)
	Tests-NZ beam	12.646H	1	3/4	22(418)
	RFO Poly	4027/1123R	1TV	3/4	4(566)
I701/180E	TNTV	11 060&11 514V	9	3/4	30(000)
	TVRFO	11.136V, 11 174V	6+TV, 3+ radio	3/4	23(149)
	Canal+Sat	11 610H	16TV, 1 radio	3/4	30(000)
	PBS	12 648HH	16TV possible	3/4	28(066)
	TVNZ/BBC	4186/964RHC	1	3/4	5(632)
	TVNZ	4178/972RHC	1	3/4	5(632)
	AFRTS DTS	4175/975L	3 TV, 3 radio	2/3	3(680)
	TVNZ/Aptn	4170/980RHC	1	3/4	5(632)
	Fiji Sky Pacific	4095/1055LHC	6TV + future radio	3/4	16(505)
	Fiji Sky Pacific	4055/1095LHC	7TV + future radio	3/4	16(505)
	TVNZ/feeds	4052/1098RHC	1	3/4	5(632)
	TVNZ feeds	4044/1106R	1	3/4	5(632)
	NBC to 7 Oz	3960/1190R	1	7/8	6(447)
	TBN Mux	3927/1223R	4TV	2/3	11 (394)
	Ioarana	3772/1378L	1	3/4	4(566)
	NASA TV	3854/1296R	1 TV	3/4	2(000)
	TVNZ	3846/1304R	1	3/4	5(632)
	USA feeds	3749/1401R	4?	?	26(400)
NSS-5/177W	Pacific IP Data	3763/1387R	none-data	3/4	27(500)
	RFO/Tempo	3920/1230R	1	3/4	2(893)
	Wallis/Futuna	3922/1228L	1		2(895)
	BYU-TV	4185/965R	1TV, 20+ audio	1/2	6(525)
	Australia Temp.	12 522V	8 SCPC	7/8 & 5/6	14 294 & 12.600
	iPSTAR Tests	12 691V	8 TV	5/6	17(600)

Receivers and Errata
New December 2003, 24/7 "Hope Chs "
FTA (occ sport); also try 3863,Sr6 100
FTA-typ NTSC-occ sport, live Shuttle
PowVu CA + **FTA**(includes BBC-W 05-05)
was 4148Vt, some **FTA**
Korean MUX, reload 12-04; new Sr
Testing on NZ/East Australia beam
Tests, late May start, also 12 646H
Testing possible data links, June 2003
SE spot beam, was 4027LHC
east spot, 10TV + r each, vertical pol
FTA 11 136 Tahitian beam, 11 174 west beam, 12/04
1+ **FTA**, MediaGd "2", + 10 975 weaker
Testing Fiji region pay-TV (MDS) package (Oct '04)
DMV/NTL early vers occ feeds, typ ca
DMV/NTL early vers., occ feeds, typ ca
'DTS Direct to Sailors, audio previously FTA - gone
DMV/NTL early vers occ feeds, typically ca
Nagravision CA (Feb 1, 2005) New PIDS
All now (including Fiji 1) CA, 7 Feb, 2005)
DMV/NTL early vers ,occ feeds, typ ca
SCPC, mixed CA and **FTA** feeds
CA, Leitch encoded
January 2006-now 4 channels, new Sr
FTA SCPC, East Hemi Beam-Tahiti
24/7 live NASA - West Hemi bm (can be difficult!)
SCPC, mixed CA & **FTA**, feeds
16-QAM (not MPEG-2 compatible)
Data only but useful for dish alignment
Wallis & Futuna Island(s) service
Outward bound W & F
Global beam - requires sizeable dish
Aust beam 12 522, 538,555,574,604,**621,639 & 657**
CA Tests - Taiwan TV, data coming?? (NZ beam)

MPEG-2 DVB Receivers: (Data here believed accurate; we assume no responsibility for correctness!)

AV-COMM R3100. FTA, excellent sensitivity (review SF May 1998); new version Sept. '99. **AV-COMM P/L**, 61-2-9939-4377.
AV-COMM Tiny Tot. FTA, 12Vdc operated, palm sized, low power consumption; review SF#120. Contact # above.
Coship 3188C. Review SF#107. Blind search FTA rcvr; works well. Phoenix Technology Group (www.phoenixsatellite.com.au) (Irdeto 2 as well as FTA versions)
Coship FTA, CA, HDD. Review SF#143, state of art functions, blind search. Phoenix (above), Satlink NZ, fax 64-9-814-9447;
Divitone: "Left-handed" review SF#115; does "code key" entry. Available http://www.satmax.ws
eMTech eM-100B (FTA), eM-200B (FTA + Cbx2), eM210B (FTA + 2xCI + positioner); KanSat 61-7-5484 6246 (review SF#89)
eM-150/Homecast. FTA + embedded multi-format, review SF#144. Sciteq (61-8-9409-6677) and Kristal (61-7-4728 7704)
Fortec Star Lifetime. Two versions, both blind search, code-key programmable, one X 2 CI. Review SF#119. www.aDigitaLife.com
Homecast (em-150, eM-1150, eM-2150) series of FTA, CA, HDD sate of art STBs, review SF#144. Sciteq (www.sciteq.com.au)
Humax ICRI 5400 (Z). Embedded Irdeto + 2 CAM slots; initial units had NTSC glitch, now fixed. Widely available; new software avail 04-04, SF#76.
Humax IRCI 5410 (Z). Adaptable version capable of holding multi-CA systems (SF#98, 99). Widely available; original importer Sciteq (www.sciteq.com.au).
Hyundai-TV/COM. HSS100B/G (Pacific) FTA. Different software; 2.26/2.27 good performers, 3.11 and those with Nokia tuners also good; later 5.0 not good.
Hyundai HSS700. FTA, PowerVu, SCPC/MCPC. Review SF March 1999. Kristal Electronics, 61-7-4788-8902.
Hyundai HSS800CI. FTA, Irdeto (with CAM) + other CA systems, PowerVu, NTSC. Kristal Electronics, above; review SF#63.
INNOVIA IDS3088. Review SF#111. Blind search FTA receiver. High quality IRD; available Phoenix TechnologyGroup, and Satmax (http://www.satmax.ws).
KAON KSF-2000/KPSF-200FTA receiver dynamic channel update/Freview channel mapping. Asoft Ltd 64-4-234-1096
KAON KSF-620R2 Multiroom FTA receiver Dynamic Channel update/Freeview channel mapping. ASoft Ltd. 64-4-234-1096.
KAON KSC-N550H2R new 160Gb Premium Dual PVR with analogue input. Asoft Ltd 64-4-234-1096.
ID Digital CI-24 Sensor. New August 2003; new lower noise tuner, extra sensitivity; CI Interface slot Irdeto 1 & 2; review SF#109. Sciteq 61-8-9409-6677.
MediaStar D7.5. New (May 00) single chip FTA; review June 2000 SF. MediaStar Comm. Int. 61-2-9618-5777 (www.mediastar.com.au)
MediaStar D10. FTA and Irdeto embedded CA. VG receiver; see review SF#96, August 2002. Contacts immediately above.
MultiChoice (UEC) 660. Essentially same as Australian 660, not grey market contrary to reports. Sciteq tel 61-8-9306-3738
Nokia "d-box" (V1.7X). European, FTA, may only be German language, capable of Dr. Overflow software. SF#95, p. 14.
Nokia 9200/9500. When equipped with proper software, does Aurora, originally did pay-TV services provided software has been "patched" with "Sandra" or similar program. See SF#95, p. 14, SF#96 p. 15. SatWorld 61-3-9773-9270 (www.satworld.com.au)
Pace DGT400/DVR500. Originally Galaxy (Now Foxtel+Austar). Irdeto, some FTA with difficulty (Foxtel Australia 1300-360818). UECs replaced
Pace "Worldbox" (DSR-620 in NZ). Non-DVB compliant NDS CA including Sky NZ, no FTA; similar "Zenith" version (see SF#115, p. 15).
Phoenix 111, 222, 333 models (no longer produced): Service, backup - Phoenix Technology Group 61 3 9553 3399; www.phoenixsatellite.com.au
Pioneer TS4. Mediaguard CA (no FTA), embedded Msym, FEC, only for Canal+Satellite (AntenneCal ++687-43.81.56)
PowerVu (D9223, 9225, 9234). Non-DVB compliant MPEG-2 unless loaded with software through ESPN Boot Loader (see below). Primarily sold for proprietary CA (NHK, CMT etc). For service only - call Scientific Atlanta 61-2-9452-3388. For revision model D9850, see Scientific Atlanta (below).
Prosat 2102S. FTA SCPC/MCPC, NTSC/PAL, SCART + RCA. Sciteq 61-8-9306-3738.
SatCruiser DSR-101. FTA SCPC/MCPC, PowVu, NTSC/PAL. (Skyvision Australia 61-3-9888-7491, Telsat 64-6-356-2749); no longer available)
SatCruiser DSR-201P. FTA SCPC/MCPC, PowVu, NTSC/PAL, analogue, positioner - (Skyvision - see above); no longer available.
SATWORK ST3618. Blind search FTA receiver. Fast search, problems, especially in "memory-filing" system, review SF#111. Available DMSi at tim@dmsiusa.com
SATWORK ST3688. Blind search, 3000+ ch memory, multi-format RF modulator; improved version 3618. Review SF#113; available DMSi (above).
Scientific Atlanta D9223, D9234, D9225; Orig. PowerVu, superceded Dec 2003 by D9850. Commercial receiver, available TVO 61-2-9281-4481, John Martin
Strong Technologies SRT2620. SCPC, MCPC FTA, exc sensitivity, ease use, programming. Review SF#91 (ph. below).
Strong 3650. Budget priced entry level SCPC, MCPC new late 2007; review SF#160 (ph. below)
Strong SRT 4800. SCPC, MCPC, PowerVu; exc graphics, ease of use; review SF#64. Strong Technologies 61-3-8795-7990.
Strong SRT 465_X (range) New mid 2007, Conax + Irdeto CA; review SF#156. Receivers state of art, above average sensitivity. USB, blind scan (ph. below)
Strong 4800. SCPC, MCPC, embedded Irdeto+ CAM slots, does code-key with additional software, Aurora. Strong Technologies 61-3-8795-7990.
Strong 4800 II. SCPC, MCPC CAM slots x 2 for Aurora +, Zee, Canal +, code key with additional software. Strong Technologies (above); review SF#103.
Strong 4890. SCPC, MCPC, 30Gb PVR, 2 CAM slots, DiSEqC 1.0, 1.2 (review SF#84), does code key with additional software; Strong Technologies, # above.
Strong 4892/4990 (new 2007). Latest technology MPEG-2;
UEC Atlas/Titan (1000). New July 2003, replacing DGT400 for Austar. No SCART, L-band loop; also available Rural Electronics 61-2-6361 3636
UEC642. Designed for Aurora (Irdeto), approved by Optus; w/new software, C-band FTA; faulty P/S. Norsat 61-8-9451-8300.
UEC660 Upgraded UEC642, used by Sky Racing Aust., Foxtel,limited FTA. (Nationwide - 61-7-3252-2947); P/S problems.
UEC700/720. Single chip Irdeto built-in design for Foxtel, unfriendly for FTA. Power supply problems, seldom sold to consumers; propensity to fall off back of trucks
"X" Digital When modified with "aftermarket" Internet softwre, does Aurora and other V-1 CA without card, review SF#119. Strong Technologies (61-3-8795-7990).
Zinwell ZMX-7500. Approved NZ Freeview, through authorised dealers; review SF#150; some unresolved technical issues as of June 2007.

Accessories.

Aurora smart cards. MCRYPT (Irdeto V2) cards now available (Jan 2005), Sciteq 61-8-9409-6677.
PowerVu Software Upgrade. PAS-8, 4020/1130Hz, Sr 26.470, 3/4, pgm ch 11 and follow instructions (do not leave early!)
PowerVu (Pacific) repair service. Cable & Sat Svcs, Darius West, 61-2-9792-1421 (Email dariusf@csaus.net.au)

WITH THE OBSERVERS

AT PRESS DEADLINE

The High Court of Fiji (Suva) decision in the case of C-Band interference between Fiji Television Limited and wireless operator I-PAC Communications (14 January) will be reported in judicial detail in our February issue; there is much new legal ground here as you will see.

Scheduled launches: January 28th scheduled - Russian AM33 to 96.5E, 30 transponders; 'February' Chinasat 9 to 134E with 22 Ku on board; March 28 VinaSat 1 to 132E with 12 Ku and 6 C.

AsiaSat 2/100.5E: TRACE (an 'urban music' service) has signed an agreement to use As2 transponder space - no word on where or whether FTA or CA but CA is most likely.

AsiaSat 3R/105.5E: "VOA/Voice of America television and radio has moved to 4040H, Sr 20.400, FEC 1/2 from As2 3880H, closing down the As2 service early in January." (**CS**, NZ)

Chinasat 6B/115E: "CCTV Hi-Vision (HD) is now on 4.100V, FTA." (**KT**) (Editor's note: An earlier report found 'New Vision HD on 4.129H, Sr 13.330, 2/3 but Irdeto CA.)

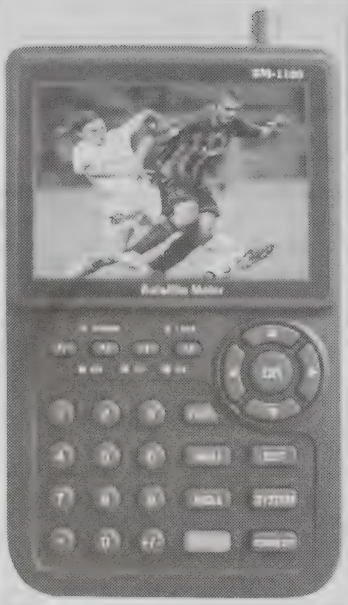
Optus B3+D2/152E: "Globecast began transmitting (January 9) on 12.733V, Sr 22.500, 3/4 with approximately the same signal level as T5 and T7. If this is in fact on B3 (not D2) it would be on T8 upper. It has been listed in the NIT of Globecast T8 lower MCPC for about a month but not actually transmitting (as of 1AM on 11th there was no NOT, PAT or CAT). They have also added 12.706V (22.500, 3/4) to the NIT on T5 (12.525V, 30.000, 2/3) and T7 (12.657V, 30.000, 2/3). Possibly this is a precursor to D2 allowing receivers to load from 12.706V when the MCPCs are moved from B3. Realising this is up against the publishing deadline, the January 16th date seems to have slipped to the 22nd according to an announcement on TV Romania International T5 teletext page which lists a telco number for technical problems: +402 1599 1420. (Editor's note: An advisory from Globecast dated 27 December *confirms* this January 22nd date.) It also appears that as of 11 January all of the horizontal B3 transponders have closed down, moving to D2 (UBI apparently moved successfully on December 18). The new (UBI) horizontal list is: (1) 12.394H, 22.500, 3/4 (NIT loads 5th, signal is inverted) with 13 TV and 13 radio ('Info' is FTA); (2) 12.421H, 22.500, 3/4 (NIT loads 6th, signal is inverted) with 13 TV and no radio (ITN and Aghapy are FTA); (3) 12.581H, 22.500, 3/4 (NIT loads 3rd) with 13TV, 13 radio (all CA); (4) 12.608H, 22.500, 3/4 (NIT loads 4th), 13TV, 13 radio (ERT, KTV, SCTV are FTA); (5) 12.644H, 22.500, 3/4 (NIT home), 13TV, 13 radio (all CA); (6) 12.671H, 22.500, 3/4 (NIT loads 2nd), 13 TV, 13 radio (all CA). ABC news feed SCPCs - have finally landed on 12.538H, 12.545H and 12.555H (all Sr 6.980, 3/4). There are also a number of data (well, not MPEG-2 at any rate!) signals scattered around the horizontal side. 'CMC' (Croatian Music Channel) on Globecast 12.706V (22.500, 3/4) V1760, A1720 seems to have switched permanently to FTA - for now. Globecast also continues to run Indian UK based pay TV channel 'Deepam' with a video data rate of only 0.6 MBit/s - it is CA but when not, video quality is extremely bad. UBI on their info channel is urging subscribers to get a friend to subscribe and for each such new customer the existing subscriber receives one month free (www.ubiworldtv.com). UBI has also replaced Greek Channel Ten with Turkish 'D-Yesilcam'." (**IF**, Qld.)

Optus C1/156E: "T5/12.487V (27.800, 3/4) which previously carried only Channel 9's Melbourne, Brisbane, Sydney services has added Channel Ten from the same three cities. This is NDS encrypted only and probably allows viewing of only those serving your geographic area. 'CNBC' is now on T9/12.647V (27.800, 3/4) having moved to make room for new 'Sky News Business Channel' on T15/12.478H (27.800, 3/4) V1071, A1072. Two new radio services have appeared: T13/12.398H (27.800, 3/4) 'RAI Radio' (A502 but CA) and 'ANT Radio' (A512-CA); both are 180 KBit/s. There were only 3 TV channels operating on T20 and each has now moved as follows: (1) 'Food' is on T13/12.398H (27.800, 3/4) at V1071, A1072, Txt 1076; (2) 'Fuel TV' is now on T18/12.598H (27.800, 3/4) V1071, A1072, Txt 1076; (3) 'CI' is now on T18, 12.598H (27.800, 3/4) V1081, A1082, Txt 1086. This leaves T20 clear of all Foxtel and Austar channels although the channel loading shows 14 TV channels (3 of which are "hidden') labelled as 'Spare' and with identical constant video data rates. As for the 3 'hidden channels', they appear to be identical to the 3 that have been on T2/12.367V (27.800, 3/4) and they are labelled 'SBS', 'Ch 7' and 'Ch 9'. None have video or audio PIDs but they do have comprehensive text EPGs which appear to be in the correct time slots for Darwin. Perhaps they are delayed for Ch 7 and 9 and SBS (from Sydney) for the Austar owned cable or MMDS system there." (**AI**, NSW)

Optus D1/160E "WIN + GWN have been seen testing on 12.424H, Sr 14.294, CA; formerly on 12.737V of B3." (**George S.**) "NZ Cue TV is now on 12.456H FTA." (**Jerry**)

Soapbox: "A recent Network 7 promo for its planned TiVO service states it will be available 'in time for the Olympics' and 'will include downloadable broadband HD; the mind fair boggles at what speed this will require on 'the net'." (**IF**, Qld.) "The Tevion brand $99 HD STB is featured at the German owned Aldi Supermarket chain (aldi.com.au) - possibly their

WITH THE OBSERVERS: Reports of new programmers, changes in established programming sources are encouraged from readers throughout the Pacific and Asian regions. Information shared here is an important tool in our ever expanding satellite TV universe. **Photos of yourself, your equipment** or off-air photos taken from your TV screen **are welcomed**. TV screen photos: If PAL or SECAM, set camera to f3.5-f5 at 1/15th second with ASA 100 film; for NTSC, change shutter speed to 1/30th. Use no flash, set camera on tripod or hold steady. Alternately submit any VHS speed, format reception directly to SatFACTS and we will photograph for you. Deadline for February 15th issue: February 3rd by mail or 5PM NZST February 4th if by fax to 64-9-406-1083 or Email skyking@clear.net.nz.



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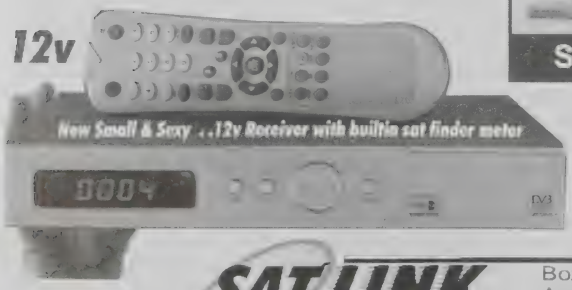

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low price is because of the volume of product they sell in Europe." (**Mark**) "Plasma screens are 'growing' larger and larger - Panasonic has shown a 150"/381cm model selling for US$100,000 and measure 12.5 feet wide by 6.5 feet high. Recommended viewing distance? 10 metres (33 feet!)." (**Arnold**) "Korea's LG Electronics is teaming with American net-based movie delivery service Netflix and will release a new web supported HD TV interfacing system in the latter half of this year. Netflix has a growing movie title base of 6,000 which it delivers currently to PC equipped clients where adequate Internet delivery speeds are available. The LG association will allow customers to link directly from their HD capable TV to the web, bypassing a need for a PC as is currently used. LG is also a pioneering member of WirelessHD, a consortium attempting to create functional hard/software to allow web delivered services of HD programming materials to be distributed within a home or building using a motion picture association approved 'DTCP' system to prevent piracy of materials so distributed. " (**Tony H.**) " Orcus Media operating the terrestrial Ku band service in Auckland has fired up 12.266 and 12.302, each with 15 programme channels, including Indian, Arabic and other Asian channels - from both Sky Tower and Wiataurua. These join 12.338 already operating which features European and English channels; hopefully, this package will also go up on satellite during the first quarter of 2008." (**T. Dunnett**) "Australia's new government has set 2013 as an analogue switch off goal. The country reportedly purchased over 400,000 STBs during 2007 but approximately 13 million remained to be upgraded with digital capability." (**NS**, Victoria) "Most recent take-up numbers from UK: BSkyB now claiming 8.1 million homes served, Freeview terrestrial 14 million. Even British cable TV grew during the year - up to 13.4% of all British homes. BSkyB's HD service also grew - now reaching 350,000 (out of 8.1 million homes served)." (Editor's note: Of special interest, 50% of all Freeview equipment sold to new subscribers was TV sets with *in-built* Freeview tuners - STBs are selling very well but the real commercial story is the rapid growth of TVs ready for Freeview without a STB - *NZ take note*!) (**Roger**) "I ponder whether the extremely high speed of data moving through HDMI cables could be a new concern for interference to wireless phones, WiFi and the like. The older art VGA leads for computers (and found on some TVs as well) have screws to keep the connectors in place thereby avoiding panics when one end or the other falls out because of the loose fitting slide-in connections." (**AI**, NSW) "There is a new web based forum functioning for those interested in Digital TV (including of course the launch of terrestrial DTT). It is http://www.dtvforum.co.nz." (**CS**, NZ) (Editor's note: And run by the same folks who do such a good job with www.apsattv.com.) "Two under construction housing estates in Orewa and Huka Falls will have 'triple-play' fibre to the home using a system Foxcom hardware from Israel. Up to 1,500 homes will eventually have this ability (30 homes have been completed), offering SKY and Freeview TV without the need for individual home dishes." (**John Nixon**)

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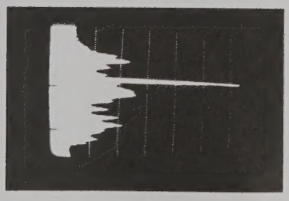
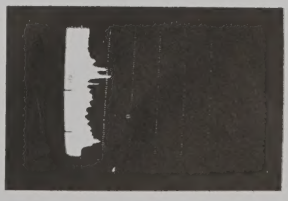


Spectrum Showing Unwired



Spectrum After Filtering

As each site that suffers interference is different, there is no one fix for all affected sites but over the past two years we have developed many combinations to give you the best chance of beating this problem. Our commercial solutions have a 100% success rate. If you are experiencing problems caused by interference feel free to call us and we will help find the best solution for you.

Coop's Satellite/Terrestrial television reception reference library

Books and other unique goodies:

❑ **TELEVISION'S PIRATES:** *Hiding behind your picture tube.* This book, semi-autobiographical by Coop, traces the long and twisted path from early over the air FTA broadcasting to attempts to operate some services in a CA (conditional access) mode. And the fun-read part - the guys (and gals - identified by name and location) who "beat the system" or at the very least made life miserable for the service providers. This is the REAL story of television piracy, spanning nearly 50 years of time and hundreds of personalities. (First printed 2006) 928 pages - you won't read it the first night! US$29.95 (includes shipping inside USA - not Canada!), Au$34 plus shipping from NZ, NZ$39 (includes shipping inside New Zealand).

❑ **C-BAND Remembered:** More than 30 "stories" by the pioneers of home satellite reception. It was an era never to be repeated - American technology that reduced the cost of a (C-Band) home dish from $15,000 to under $1,000 in just two years, turning home dish reception into an international system. Coop asked 30 pioneers for their reflections on what they did, why, when and where and this unusual book tells it all. A gentle read, approximately 200 pages in writer-chapter form plus 32 pages of full colour illustrations from the 1980s era. (First printed 2007) US$20 (includes postage inside of USA), Au$23 plus shipping from New Zealand, NZ$27 (includes shipping inside of New Zealand).

❑ **SatFACTS Anthology:** Issues 1 through 156 (the first 13 years!) on CD/DVD. Nearly 5,000 pages of *SatFACTS* - from the first appearance of home satellite dishes in the Pacific through August 2007. The genuine material as it happened, right their on your PC screen (requires Acrobat Reader software to be used). US$40/Au$45/NZ$53 postage paid.

❑ **CATJ-CSD Anthology:** 1974 through 1987. Before there was SatFACTS, back in the US of A, from 1974 through 1979 Coop created CATJ (*Community Antenna Television Journal*) and from 1979 through 1987 CSD (*Coop's Satellite Digest*). This spans the full era from before satellite to the end of C-Band as America had grown to love it (from no home dish systems in 1978 to more than 3 million in 1987!). More than 10,000 pages (!!!) of as it happened - warts and all. This is the bargain of all bargains - US$30/Au$38/NZ$47 includes postage.

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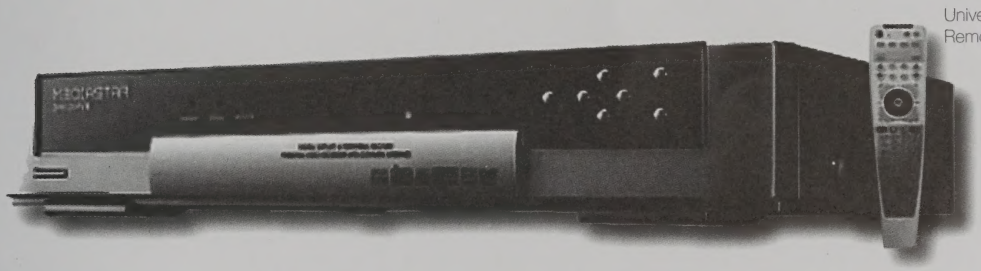

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